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THE ADMINISTRATION OF TUBERCULIN.[1]

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The object of this paper is to present facts and arguments which may go at least some way towards proving that the administration of tuberculin to patients attending out-patient departments of hospitals and dispensaries is not only safe and feasible, but is, for the sake of the nation as well as the benefit of the patient, a proceeding which is to be approved.

In the Out-Patient Departments of the various Hospitals for Consumption we find the cases are usually grouped somewhat as follows: (1) Very early cases, definitely diagnosed or suspected, which are readily admitted as in-patients and are often passed on for sanatorium management; (2) more advanced cases, where, in the opinion of the medical officer, the patient is not likely to regain a position amongst the ranks of the wage-earners, and who, in consequence, requires to be treated as an out-patient until the disease has progressed so far as to make it neces-

[1] The present paper forms part of the material submitted as a thesis for the Doctorate of Medicine of the University of Edinburgh. I desire to express my thanks to Dr. James Mackenzie and Dr. T. N. Kelynack for placing at my disposal out-patients from their cliniques at Mount Vernon Hospital for Consumption and Diseases of the Chest; I must also express my appreciation of the generous kindness of the late Dr. Carey Rees, who was my colleague at Margaret Street Hospital for Prevention of Consumption, in permitting me to attend on his day as well as my own, so that patients undergoing tuberculin treatment might be seen twice a week.

sary for the case to be recommended to the Poor Law Infirmary or to a Home for the Dying; (3) patients with symptoms referable to the chest, but without evidence of tuberculosis.

The result of such a grouping is that when a patient with a tuberculous lesion is fortunate enough to come under medical observation whilst in the first category, he is put on a "waiting list" for admission, and is treated symptomatically meanwhile. If he has financial means sufficient to secure his not having to return to work immediately on his being discharged, he stands a better chance of preferential treatment. If he can, in addition, contribute something towards his maintenance at a sanatorium, he is fortunate indeed, for his chances of admission are probably increased.

From the first, admittedly a large percentage of cases are considered incurable, whilst only a small percentage are treated with the expectation of bringing about a cure. Even so, when we turn to the statistics of those sanatoria where the most rigorous selection is made, we find it is by no means the invariable rule that all cases do well. It is certainly astonishing how very many patients return to the out-patient department for treatment within a few weeks of their discharge from the sanatorium. Below is a table, showing the results of six and a half years' experience at Fairlight Sanatorium, Hastings. The statistics have been prepared by Dr. Nigel F. Stallard. The cases have been classified according to prognosis at the time of admission: Class I.—Quite early cases; Class II.—Moderately advanced, but with a good chance that arrest of the disease will follow sufficient treatment; Class III.—More advanced, but not hopeless cases; Class IV.—Cases where at best only temporary benefit may be expected.

The following tables give the results, as far as obtainable, since the formation of the sanatorium:[1]

TABLE I.

Indicating the Condition of Patients on Discharge[2] *from the Fairlight Sanatorium.*

	No. of Cases.	Arrested.	Much Improved.	Improved.	*In Statu Quo.*
Class I.	25	10	6	8	1
Class II.	27	7	7	10	3
Class III.	66	—	12	43	11
Class IV.	10	—	—	2	8
	128	17	25	63	23

[1] See Annual Report of the Margaret Street Hospital for Prevention of Consumption, 1911.

[2] Note that only those discharged in the earlier part of the year are included.

TABLE II.

Indicating Results to Date of Treatment of 128 Tuberculous Cases since Discharge from the Fairlight Sanatorium.

	Well and Working.	Well, not Working.	Fairly Well (some at Work).	Ill.	Dead.	No News.
Class I.	17	—	3	2	—	3
Class II.	13	3	1	2	1	7
Class III.	13	1	9	9	8	25
Class IV.	—	—	—	2	4	3
	43	4	13	15	13	40

"It will, I think, be seen that, leaving out of account those cases which we have been unable to trace, nearly fifty of our old patients regard themselves as quite well."

It must be the experience of everyone that sanatoria do not settle the problem of consumption. Although most valuable educational work is done at these institutions, as well as the benefit of a temporary or permanent kind the patients derive, still there remains the great mass of patients who cannot obtain admission, or who have for some reason been discharged before a lasting cure has been wrought. A line of treatment, therefore, that will raise the patient's immunity seems most reasonable to try, particularly if it can be adopted without interference with the patients' mode of life.

General Method of Treatment of Consumptive Out-Patients.

The first practical difficulty in the management of tuberculous cases arises from the system that obtains of "hospital letters," whereby a patient procures a letter through a subscriber which entitles him to usually six weeks' treatment, and if the course is to be prolonged the letter must be renewed when it runs out. This is an excellent way of obtaining patients and funds *pari passu*, but it often happens that the continuity of treatment is broken just when the course is in full swing. At Margaret Street Hospital for Prevention of Consumption the plan has been adopted of not requiring the letters of patients to be renewed who have tuberculosis definitely diagnosed. At Mount Vernon Hospital the committee have abolished any requirement regarding "letters" for attendance at the Out-Patient Department. Necessitous patients requiring tuberculin treatment find no barriers in the way.

The next difficulty is that connected with time and frequency of attendance. To obtain the best, and certainly the quickest, results with

tuberculin, it is necessary that patients should be seen at such frequent intervals as twice a week, or, in some cases, even on alternate days. It is usual in connection with most hospitals for members of the staff and their clinical assistants to attend one day in each week. As this is probably as much time as can be spared for hospital out-patient work in one hospital, it would manifestly be an advantage to continue this method. One group of cases has been treated in this way; and while the time taken to immunize the patients is double as long as when seen twice a week, the method is particularly applicable to patients having large doses—as, for example, those who have had a tuberculin course as hospital in-patients or during residence at a sanatorium, and who are recommended thence for continuance of tuberculin treatment, and who react less or more each time an increased dose is given. Of the cases which have been under our observation, two-thirds are seen twice a week. These are mostly cases which have started from the smallest doses as out-patients, and they undoubtedly progress more satisfactorily than those seen only once. In a very few instances cases have been seen every alternate day for a limited time, to get through a critical period in the administration of the tuberculin.

Temperature Records as Clinical Guides.

To be effective, or even safe, tuberculin treatment must be guided to a large extent by the variations in the patient's temperature after each dose. At first it seemed unlikely that the patients could be trusted to take their own temperature with sufficient reliability; but it was soon found that, except with the very obtuse or the very young, it is quite possible to get sufficiently accurate records. In many instances the local district nurse goes for the first few times, and explains the clinical thermometer and its uses. It is found most convenient to get the patient to jot down on a slip of paper the records of temperature, and the actual charts are usually both entered up and kept at the Out-Patient Department or wherever the cases are examined. When a patient understands from practical experience what is meant by a reaction, and at the same time feels confidence in the benefit he is receiving, it is wonderful how intelligently he co-operates. One ventures to think that many times the temperatures are more accurately recorded than where in hospital an inexperienced probationer, without enthusiasm for her work, has the matter in hand.

Where patients are living at home or are at work one does not wish to interfere more than possible with their mode of life, and, at the same time, it is manifest that a morning and evening temperature very often do not give the extreme limits of variation. When working with Dr. William Russell in the Edinburgh Royal Infirmary, I learnt that the difference between a maximum and minimum chart compiled from

a four-hourly record was very striking as compared with the ordinary morning and evening chart. As has been pointed out by Lawrason Brown,[1] the highest temperature is often in the afternoon. The rule adopted, therefore, is to have the temperature taken, under the tongue, at eight o'clock in the morning, at four o'clock in the afternoon, and at eight o'clock in the evening. Also that if the patient is having what he soon recognizes as a reaction, the temperature should be taken. It is very interesting to watch the temperature chart of a patient over a prolonged period. There seems an instability about the temperature of some patients. This is often observed in women during the week preceding menstruation. Dr. W. H. Wynn[2] published charts bringing out the point, and it has often been confirmed. Besides the general interest of the observation, it is a matter of some importance in understanding the progress of the case. The range of temperature is of importance also. Each patient seems to have a type which remains more or less constant. The exact value to be put on the range when the maximum is not above 99·0° F., has not, so far as can be ascertained, been definitely worked out. If it were conceded that the normal line varies with the individual, then the swing *per se* would assume great importance.

One case usually had a temperature of 99·5° F. to 100·5° F. on Sunday evening, and as his injection was given on Wednesday and Saturday, it seemed natural to connect the two things. However, as the temperature never occurred on the Thursday, further inquiry was made, and it was found that he sang in a church choir, and this was apparently responsible for an auto-inoculation. A rise of temperature is found to occur with any severe unwonted exercise.[3]

Not infrequently constipation, influenza, bronchial and nasal catarrhs, cause the temperature to rise and be irregular for a longer and shorter time. It is a matter of the greatest moment to the treatment to recognize this, as otherwise the progress of treatment might be unnecessarily interfered with.

The Use of Drugs during Tuberculin Administration.

In this country, and especially when the cases are out-patients, it is impossible to carry out a range of experiments without having regard to the patient's immediate symptoms. At the same time, one knows that the relief of symptoms is palliative rather than curative. It has, therefore, been the general policy not to give drugs other than tuberculin, unless some symptom is specially complained of; then to treat this in addition for, perhaps, a few days or weeks. This adds so much to the patient's comfort, and does not seem contra-indicated at all in the

[1] See "A Treatise on Tuberculosis." Edited by Arnold Klebs, M.D.
[2] See *Medical Magazine*, July, 1911.
[3] Paterson, Marcus: Transactions of Royal Society of Medicine, vol. xxxi.

administration of tuberculin. The great majority of the cases have no other treatment than the tuberculin. Amongst the exceptional cases are a group of associated tuberculous larynx with pulmonary tuberculosis. This condition is of such a desperate kind, and so little amenable to radical treatment, that it seemed only right to combine, or rather to add, tuberculin to the routine palliative treatment prescribed by the laryngologist; six cases of this kind are amongst those I have treated, and all are showing marked recession of the laryngeal tuberculous condition.

Choice of Case for Tuberculin Treatment.

It is of supreme importance in any treatment to choose only such cases as are suitable. On the one hand, the patient must have a definitely tuberculous lesion; on the other, the treatment must not aggravate the lesion.

With regard to age, the youngest case we have treated was four years old, and the oldest sixty-two years. There is no ascertainable age limit that became evident either way. It seemed, however, that small children may be more sensitive and ready to react. For example, a child, aged seven, was, perhaps, the most sensitive case treated. But of several other children, younger, none offered any special difficulty. The great bulk of cases were in the fourth decade, but this was more a matter of accident than otherwise. If the question of age is considered, it must be partly from the inconvenience of giving small children repeated injections. What plays a greater part is the temperament of the patient. A certain nervous temperament, the erethic type, seems to react readily and not to maintain the physical condition. It was, of course, a *sine quâ non* that there were not serious renal, cardiac, or other complications. Two cases were the subjects of more or less definite depression, but this steadily improved as the doses increased; one developed mental symptoms during treatment.

In order to arrive at a definite diagnosis, the first place must be accorded to definite physical signs in the chest. However, to treat incipient phthisis, obviously the disease must have advanced some way before physical signs are definite. While the physical condition is debatable, the presence of tubercle bacilli in the sputum was considered diagnostic; this was present in two-thirds of all the cases treated. With regard to the other third, the history was an element of importance; thus loss of appetite, loss of weight, shortness of breath, cough, expectoration, hæmoptysis, rapid pulse without obvious cause, previous chest condition, particularly pleurisy, with fatigue on exertion, were all highly suggestive of the condition. If there were also dulness over any area of the lung, with perhaps restricted expansion and distant breath sounds, it was almost conclusive.

In fifteen cases a subcutaneous test with Old Tuberculin, as will be afterwards described, was given, and if a focal reaction was present, no doubt was felt as to the site and nature of the lesion; while if a general, as well as a local, reaction occurred, although it was not possible to localize more accurately the lesion as being in the chest, such a definite response to a tuberculin injection seemed to justify the diagnosis. There were only four cases in which the grounds, apart from the tuberculin test, were rather uncertain, but in all these cases very remarkable improvement took place in the general health with tuberculin treatment.

It is here important to say that perhaps twenty of the cases were X-rayed by the radiographer at Mount Vernon Hospital. The exact interpretation of the plates in every case seemed open to discussion; and although very beautiful pictures are taken with rapid exposure whilst the patient holds his breath at the end of a full inspiration, and while information may be gained about the condition at the root of the lung, it is not usually possible to form a more trustworthy estimate of the state of the lung as a whole than can be formed by clinical examination in the light of the history of the case.

It has been a great disappointment to the radiographers that in Powell and Hartley's work[1] more stress was not laid on the value of their work. For example, several cases were submitted where there had been hæmoptysis without any cardiac or renal condition, and the strong presumption was that the cause was pulmonary, but no aid in localizing the site of hæmorrhage was obtained.

The Consideration of Physical Signs.

It is difficult to define what case is too far advanced for tuberculin. Cases running temperatures above 100° F. were thought unsuitable. In these what is termed conveniently a "mixed infection" is considered to be present, and there is nothing to be gained by antagonizing one infection alone, particularly as the temperature chart ceases to be a guide to the treatment.

The term "mixed infection," though hitherto not much used in this country, describes a condition worked out by Koch.[2] Osler recognizes the condition; Griffith[3] says the persistent mixed infections are the cause of—(1) hectic fever of chronic tuberculosis, and (2) amyloid disease. Mixed infections are not amenable to treatment by tuberculin;

[1] Powell, Sir R. Douglas, and Hartley, P. Horton-Smith: "Diseases of the Lungs." London: H. K. Lewis. 1911.

[2] See Koch, R.: "Die Ætiologie der Tuberculose," M. a. d. K. Gesund., Teil 33, *Deutsche Medizinische Wochenschrift*. Consult also Cornet's "Tuberculosis" (American edition, 1904).

[3] Griffith: "Studies in Pulmonary Tuberculosis." London: Baillière, Tindall and Cox. 1911.

rather their presence contra-indicates its use. They are dealt with by means of rest, fresh air, dieting, general measures, etc.

It is of paramount importance to mention the question of physical signs as an indication or contra-indication for the administration of tuberculin. The toxæmia and tissue destruction brought about by tubercle bacilli may be out of proportion to the physical signs of the disease thereby wrought. Thus it is common experience that a child with miliary tuberculosis may be examined by the most skilful clinician and reveal but little on physical examination, and a few days afterwards display on the post-mortem table disease in every lobe of both lungs. It is therefore impossible to say that tuberculous disease of the lungs is absent if no physical signs are present. Also when the disease is of a chronic type very great lung destruction may have taken place, giving rise to extensive physical signs without so much interference with nutrition as in a much less marked case. In these researches the mere presence of extensive physical signs has not deterred one from giving tuberculin, while one recognizes the improbability of effecting permanent arrest.

The presence of tubercle bacilli in the sputum is regarded as practically a certain diagnostic. Out of sixty-three cases examined it was found in forty. In every one of our cases the examination was made by the ordinary Ziehl-Neelsen method. Opportunity did not offer to use the new Anti-formin method of Uhlenhuth, which gives usually a higher percentage of positives than the older method.

Review of the Continental Position as regards the Subcutaneous Tuberculin Test.[1]

Technique.—For this purpose Koch's Old Tuberculin is used. It is diluted with 0·5 per cent. phenol in normal saline. The initial dose now usually given is 0·0002 c.c. (this is, however, only one-fifth the dose that has been commonly employed for adults in these cases). This is injected conveniently into the upper arm. If no reaction takes place in three days 0·001 c.c. is injected, to be again increased to 0·005 c.c., and a final dose of 0·01 c.c. given. In the event of a reaction in any stage—if severe, the result is considered positive; if not severe, the dose is repeated, when usually a more definite reaction occurs.

Reaction.—This is—(*a*) local at site of injection; (*b*) focal at seat of disease; (*c*) general. The local reaction consists in swelling at site of injection (usually the upper arm), pain, and redness. The extent varies with each case, but is always very marked, extending from elbow to

[1] Much of the material presented in this section is based on the observations and views of Bandelier and Roepke in the last German edition of their classical work, "Lehrbuch der Spezerischen Diagnostik und Therapie der Tuberkulose." Fifth edition. Würzburg: Curt Kabilzsch. 1911.

insertion of deltoid muscle. There may also be a needle-track reaction which is of doubtful value.

In all cases the patient has kept his temperature for at least the week previous to having a test dose, taking it thrice daily at 8 a.m., 4 p.m., and 8 p.m. The general reaction is usually well marked, the temperature rising the day after the injection to perhaps 102° F. for a few hours. If, however, the temperature rises (0·5° C.) 0·9° to 1·0° F. above the highest of the previous week, it is considered to satisfy the condition.

With the rise of temperature there is often a severe, dry cough, increased pulse rate, vague pain in limbs, feeling of malaise, and headache. These usually last but a short time, perhaps twelve hours, and gradually pass off, but are often of sufficient severity to keep the patient in bed—at most twenty-four or thirty-six hours. The patient for several days feels better than before he had his test dose, and almost invariably puts on a pound or two in weight. The particular in which the subcutaneous test differs from all the other tests is the presence during the reaction of focal signs and symptoms. This is, of course, of the utmost value in localizing a doubtful lesion when it can be observed.

The value of the subcutaneous tuberculin test was emphasized by Koch[1]: "To obtain a reliable result it (tuberculin) must be given subcutaneously." In spite of the many newer methods this is still admittedly the most reliable. So many observations have been made that the value positive and negative is pretty well defined.

In veterinary practice 2 to 3 per cent. of cattle reacting to tuberculin and slaughtered were found to be without a tuberculous focus. Consequently, having regard to this small margin of error, tuberculin can be looked upon as an almost infallible means of determining the presence of tuberculosis in cattle (Schütz).

Of 324 patients, who between October, 1904, and October, 1909, received subcutaneous injections of tuberculin at Tübingen Medical Hospital, in which the apices were thought to be involved, 197 or 60·8 per cent. gave focal reactions at apices with general reaction; 24 or 7·4 per cent. focal reaction only; 76 or 23·5 per cent. general reaction only; 27 or 8·3 per cent. neither focal nor general reaction.

The focal reaction is demonstrable with percussion, particularly two to three days after injection, and lasts four to five days—v. Romberg and Otten both expressly state, so also do Roepke and Bandelier, that no permanent harm to the lung can result from the focal reaction. Of 18 people who showed no reaction, focal or general, to subcutaneous test and received no treatment, enquiries at the end of two and a half years showed that 17 were healthy, while 1 had developed fistula in ano and tuberculous larynx. Out of 47 examined later who had given

[1] Koch: *Deutsche Medizinische Wochenschrift*, No. 7, 1890.

only a general reaction, 44 were healthy. Three showed deterioration in lungs and general condition. Subsequently, of 135 who had given focal reaction, 2 had died, 82 pronounced worse, 51 only permanently arrested and able to work.

From this it is evident that when a focal reaction can be made out after the subcutaneous test, the diagnosis of a sufficiently active lesion to warrant treatment is certain ; when the reaction is general only, the clinical history and physical examination must be taken into account in coming to a decision as to the nature of the lesion causing it.

It is here important to repeat that those of the widest experience in the use of the subcutaneous test are agreed that, when used to establish a diagnosis, it is practically always without permanent harmful effect. Penzold, speaking at the International Congress of Medicine, 1910, said: "With the exercise of the greatest precaution, ill effects have been so very, very seldom observed in thousands of tests that they may be considered as negligible." The principal precautions are to avoid its use in febrile cases, or when recent hæmoptysis has occurred where cardiac or renal disease is present, epilepsy, hysteria, severe neurasthenia, suspected intestinal and miliary tuberculosis.

It is generally admitted that the great delicacy of the cutaneous tests render them of very little practical utility; within one's own experience many instances have occurred of doctors and nurses responding in the most positive way to von Pirquet's reaction, when at the time, or since, no lesion of sufficient activity to cause signs or symptoms has been demonstrated. The negative value, however, of von Pirquet, where an active lesion is present, is of definite prognostic value as indicating so profound an interference with the metabolism that the ordinary reaction does not occur. It is claimed that with the subcutaneous test there is a prognostic value in the dose required, the height of fever in reaction, and the cessation of the reaction—a slight lesion reacting to a smaller dose—but the evidence adduced in support of this contention seems, at present, to be rather slight.

The following figures seem to give a clearer idea of the value to set on the subcutaneous reaction taken alone. Out of 400 recruits in a Bosnian regiment recruited from a district where tuberculosis was rife, 61 per cent. gave reaction to doses of 0·003 c.c. ; whereas in a Hungarian regiment, from a less tuberculous neighbourhood, the percentage was 38. In each case the recruits showed no clinical manifestation of the disease. In the following years 7·6 per cent. of the Bosnian and 3·2 per cent. of the Hungarian men developed active signs. In the cases here referred to the test dose was used in 28 cases, all of them doubtful or with physical signs, and 26 gave a positive result.

In 4 of these cases where there was not quite enough evidence otherwise, and the balance in coming to a diagnosis was turned by the

test, at subsequent examination tubercle bacilli were found present in the sputum. In 2, in which focal reactions were present when patients were subsequently seen, the doubtful physical signs were for the time rendered more definite.

The Choice of a Tuberculin.

It is due to the epoch-making researches of Robert Koch that tuberculin has been introduced into medicine. Since his original work twenty or more years ago, many preparations have been introduced of varying merit. Some designed to produce active immunity, whilst some produced passive immunity. The tuberculins used in these researches are of the former category—that is to say, that they produce a change in the organism by the absorption of the bacteria and their products, which leads to the appearance of specific protective bodies (antibodies) in the serum.

The first in point of discovery is Koch's *Old Tuberculin*. This is prepared as follows: Pure cultures of tubercle bacilli four to six weeks old on 5 per cent. glycerine broth are sterilized by heating in steam, filtered and concentrated to one-tenth its volume, thus obtaining in 50 per cent. glycerine medium the soluble bodies secreted by the tubercle bacilli. Thus Old Tuberculin contains, in addition to the soluble secretions, portions of the bodies of the bacteria extracted during the hours heating and steaming by the alkali and glycerine contained in the culture broth. This tuberculin, when first introduced in the doses then used, produced such violent reactions that, particularly owing to the discredit thrown on it by Virchow, it fell into disrepute and was allowed to lapse in this country.

Of the newer preparations, the most used a few years ago was Tuberculin T.R. (Koch's New Tuberculin).

Old Tuberculin aimed at a bacterial antitoxic action, but conferred no immunity against the bacteria. The condition is compared by Bandelier and Roepke to the tetanus antitoxin, which does not kill the bacteria. They may survive the toxic immunity and ultimately kill the patient. With cholera and typhoid it is different, where living bacteria are soon destroyed in the body of the immunized animal. Koch wished to attain the double immunity in the early stages of the disease. The experiments on guinea-pigs where the bacilli were in large numbers in the blood, were hardly comparable to the condition in lung cavities which are local infections. As the absorption of active organisms gave rise to the formation of abscesses, Koch hit upon the plan of grinding up well-dried cultures in an agate mortar without addition. The powdered mass was stirred up in normal saline and centrifugalized. This separated it into two layers. The upper layer T.O. contained glycerine soluble substances; the lower T.R., the sub-

stances left behind after glycerine extraction. In Koch's hands a very high degree of immunity could be produced without causing reactions by gradually increasing doses, the patient becoming quite immune to large doses of Old Tuberculin.

Stock solution of T.R. is 20 per cent. glycerine and 1 c c. = 2 milligrams of solid residue—that is to say, 1 c.c. of the fluid contains the immunizing substance of 10 milligrams of dried bacteria (Ruppel).

T.R. Tuberculin has two very great drawbacks. The first is the cost, which is eight or ten times that of some of the other preparations; and secondly, that it is so unstable that the solutions are unreliable after a fortnight. My using it for one group of cases was simply due to the fact that it was in use amongst the in-patients at Mount Vernon Hospital.

Bacillary Emulsion has both the elements of T.O. and T.R. The preparation has not been centrifugalized after suspension in normal saline, simply allowed to settle, and 50 per cent. glycerine added. Its employment was the result of agglutination experiments by Koch, Arloing, and Courmont in monkeys. The preparation was first recommended to be used in rapidly increasing doses which produced violent reactions. However, it was shown that no advantage was to be gained by the reactions, and now Jochmann tells us that the best results in the hands of Koch and his assistants have been obtained otherwise. Koch's agglutination experiments often break down in individual cases, and it is not considered that there is an absolute relationship between agglutination and immunity. Christian and Rosenblat have demonstrated the presence of agglutination and the curative effects of Bacillary Emulsion when studying the antibodies and immunity in guinea-pigs. They demonstrated the formation of connective tissue as a reparation process. The stock solution Bacillary Emulsion is of a strength that 1 c.c. = 5 milligrams of solid bacterial residue. The antipyretic power of Bacillary Emulsion was emphasized by Krause. Bandelier and Roepke (p. 184) speak also to the disappearance of fever without reaction being caused by small increasing doses of Bacillary Emulsion; they also cite the recently published careful experiments of John, which were confirmed after a year by the re-examination of the cases. He did not invariably obtain permanent results, but always had great immediate benefit as regards general health and as regards fever, even in very advanced cases. His largest dose was one-fifth of a milligram.

It is unnecessary here to discuss all the tuberculins, but as the investigations have been carried out with a view to independently reviewing the position of Dr. Camac Wilkinson, it is essential to mention the theory of Carl Spengler. Spengler's view of relation between human and bovine bacilli can be summarized as follows:

"The toxins of bovine tuberculosis are less toxic to tuberculous man, far less than the tuberculins of human tubercle bacilli. As immunizing and curative agents, they are far superior. The curative process in tuberculosis under their influence occurs in shorter time, and, because of their less poisonous character, safely and rapidly. My experiments with bovine toxins in man, and those first of Koch, and then of von Behring, relating to immunizing cattle with human tubercle bacilli, have established that there exists between the toxins of bovine and of human tubercle bacilli and their hosts a reciprocal antagonism of natural origin, in the sense of Jenner's discovery. The two originally identical infecting agents have become in their respective hosts vaccines in respect of each other, and as such are naturally no longer identical in pathological sense. In my conception of bovine and human tubercle bacilli, it is a case of the evolution of distinct varieties. The most striking result of the vaccinal qualities of the bovine toxins is that to tubercular man they are far less poisonous than the human tuberculins, although the bovine bacilli show themselves more virulent to cattle. If the bacteria were identical the bovine toxins must also show greater toxicity in man."

How far this is demonstrable, it is not my purpose to argue, but the fact is that many observers find it easier to treat their cases by taking them through gradually increasing doses of the bovine tuberculins (of Koch), Perlsucht Tuberculin Original and Perlsucht Tuberculin (the latter being concentrated so that it is fifty stronger than the former), then going through a course of Old Tuberculin. The greater number of these cases have been treated by this sequence, and, comparing them with the B.E. range, I think the sequence is easier to administer without reactions. But when a case has reached a maximal dose—1 c.c. (1 milligram) of Old Tuberculin, it not infrequently happens that on careful auscultation evidence still remains of some degree of activity of the disease in the lungs. In these cases it seems reasonable to supplement the Old Tuberculin with Bacillary Emulsion until a dose of 5 milligrams is given without reaction. Besides the tuberculins mentioned, I have some slight experience of Béraneck's tuberculin, but at present am not concerned with it.

Dosage of Tuberculin.

The method of administration which I have followed was inaugurated by Dr. Camac Wilkinson at the Kennington Dispensary, but experience has shown that it can be simplified somewhat as follows:

In the P.T.O., P.T., and O.T. sequence it is necessary to have, besides pure P.T.O., two dilutions, a $\frac{1}{10}$ and $\frac{1}{100}$ solution, the diluent being 0·5 per cent. phenol in normal saline. Where a large number of cases are being injected it is convenient to prepare perhaps 5 c.c. of

each dilution; this can readily be done with a graduated sterilized pipette. The dilutions can either be kept in the small wide-mouth indiarubber corked bottles in which the tuberculin is supplied by Messrs. Meister Lucius and Brunig, or they can be put in sterilized watch-glasses, being kept carefully covered between each case, but what remains over being destroyed each day. Of P.T. it is necessary to have one dilution, a tenth of the strength.

As regards a syringe, the simplest and best is a 1 c.c. or 2 c.c. "Record," with a platinum iridium needle, which has fewer disadvantages than any other one knows of. It can be boiled, and then boiling sterile water run through between each patient.

The Bacillary Emulsion with which we have worked has been supplied by the Laboratories of the Mount Vernon Hospital and University College Hospital in test-tubes or bottles of coloured glass with indiarubber caps which can be perforated by needle for each dose. This prevents contamination, and has the advantage that the emulsion which naturally tends to sediment has to be inverted each time. The solutions are ranged from:

E	1 c.c. = $\frac{1}{10000}$	milligram B.E.
D	1 c.c. = $\frac{1}{1000}$	,, ,,
C	1 c.c. = $\frac{1}{100}$	,, ,,
B	1 c.c. = $\frac{1}{10}$	,, ,,
A	1 c.c. = $\frac{1}{1}$	,, ,,
AA	1 c.c. = 1 milligram.	
AAA	1 c.c. = 5 milligrams.	

The doses usually increase by about 50 per cent. in either sequence, so that the last dose but one is half the dose being administered, commencing them with:

$\frac{1}{1000}$ P.T.O.

0·001	c.c.	P.T.O.,	1st dose.
0·0015	c.c.	,,	2nd ,,
0·002	c.c.	,,	3rd ,,
0·003	c.c.	,,	4th ,,
0·004	c.c.	,,	5th ,,
0·006	c.c.	,,	6th ,,
0·008	c.c.	,,	7th ,,

$\frac{1}{100}$ P.T.O.

0·01	c.c.	P.T.O.,	1st dose.
0·015	c.c.	,,	2nd ,,
0·02	c.c.	,,	3rd ,,
0·03	c.c.	,,	4th ,,
0·04	c.c.	,,	5th ,,
0 06	c.c.	,,	6th ,,
0·08	c.c.	,,	7th ,,

Pure P.T.O.

0·1	c.c.	pure	P.T.O.,	1st dose.
0·2	c.c.	,,	,,	2nd ,,
0·3	c.c.	,,	,,	3rd ,,
0·4	c.c.	,,	,,	4th ,,
0·6	c.c.	,,	,,	5th ,,

$\frac{1}{10}$ P.T.

being 5 as strong.			
0·02	c.c.	P.T.,	1st dose.
0·03	c.c.	,,	2nd ,,
0·04	c.c.	,,	3rd ,,
0·06	c.c.	,,	4th ,,
0·08	c.c.	,,	5th ,,

Pure P.T.

0·1	c.c.	P.T.,	1st dose.
0·15	c.c.	,,	2nd ,,
0·2	c.c.	,,	3rd ,,
0·3	c.c.	,,	4th ,,
0·4	c.c.	,,	5th ,,
0·6	c.c.	,,	6th ,,
0·8	c.c.	,,	7th ,,
1·0	c.c.	,,	8th ,,

O.T.

0·15	c.c.	O.T.,	1st dose.
0·2	c.c.	,,	2nd ,,
0·3	c.c.	,,	3rd ,,
0·4	c.c.	,,	4th ,,
0·6	c.c.	,,	5th ,,
0·8	c.c.	,,	6th ,,
1·0	c.c.		

(B.E. 1 milligram.
1·5 ,,
2 ,,
3 ,,
5 ,,)

In using Bacillary Emulsion or T.R. (Koch's New Tuberculin) commence with, say:

$\frac{1}{3000}$ milligram,
$\frac{1}{3000}$,,
$\frac{1}{3000}$,,
$\frac{1}{1200}$,,
$\frac{1}{1000}$ and so on, up to 5 milligrams.

The dosage is thus simple to state, but not one single case has gone through without reaction. If the reaction is slight, say up to 99·5, the last dose is repeated. If severe, no dose is given, and at the end of a week the last dose is repeated. If then the reactions recur in spite of repeated doses, it is usually possible by halving the dose and giving these half-doses at intervals of two days to get the patient over the sensitive period. Once past a sensitive period the dosage generally goes on without departure from the table. It is strange that every patient has a sensitive period of longer or shorter duration. Sometimes with the higher doses the interval has to be lengthened, but it is more satisfactory not to lengthen it beyond once a week. Some of my cases have been seen fortnightly or at intervals of three weeks, but this is not to be recommended if avoidable.

A difficulty that meets the worker with tuberculin, who wishes to demonstrate his results, is that the criteria by which progress is marked are of such a nature that they do not lend themselves to graphic methods. For example, the patient's weight may not advance, and watching the weight would lead him to be very disappointed often.

It is obvious that the tuberculin method makes great demand on the patient in seeking to raise his immunity by the injection of bacillary substances. The case is otherwise with the gentian and soda, cod-liver oil treatment, which endeavours to stimulate the digestion and provides easily assimilable fats. Here the weight naturally rises until the limit of digestion is reached.

Pleasing as it is at sanatoria to watch the weight rising, it is remarkable the number of cases which come for further treatment to the Out-Patient Departments soon after returning to their home surroundings, when the normal weight is reached through the loss of this adventitious weight and the gross evidences of disease recur. Our uniform experience is that under tuberculin, strange as it may seem, there is a trifling increase of weight after a test dose; that during the treatment the typical patient loses perhaps two or three pounds during the first month or two, and then gradually gains weight until at the end of the course he is perhaps five pounds or so heavier than when he commenced. After the treatment ceases a further increase in weight is expected to take place. From this experience it is evident that, unless a serious loss of weight occurs, the patient may be reassured with confidence.

Of the cases we have treated only two show loss of weight up to one stone. The one, a school teacher, who is continuing her work, is a highly nervous girl, and is always in an anxious state lest the educational authorities should know the state of her lungs. She is an old-standing case with frequent hæmoptysis who has defied other treatment. The other is an actor, whose pulmonary condition was considered hopeless several months before he was recommended tuberculin treatment, and who has had intercurrent trouble. There is one other instance of serious loss of weight—his case was referred to me from Mount Vernon Hospital—and who, too, was considered to have a bad prognosis. For the rest, although the weight has not increased much in any case, the average is maintained. The remarkable thing is the often rapid, or, if not, gradual loss of dyspnœa, so that the patient can move about more and can sleep better, and consequently feels emancipated from the limitations of his disease. Following on this is the power and desire to resume work, which is possible in the great majority of cases.

So far as sputum is concerned, it often is at first increased, but gradually diminishes, becomes serous instead of purulent, and the tubercle bacilli cease to be present if a sample can be procured at all. The patient's skin also alters in a subtle way, so that he looks well and blooming instead of poisoned and anxious.

When we come to physical signs it is quite another matter. These seem to me to change very slowly. Added sounds gradually get less in amount, but usually very slowly, unless in the bronchial cases. In fact, several of the cases who are on quite large doses of Old Tuberculin still have crepitations. The dullness also alters even more slowly, and so does the character of the breath sounds, as presumably repair is in the nature of a fibrosis.

The time occupied by a course of treatment under the most favourable circumstances is five months, and this often, with the delays due to reactions, lengthens out into seven or eight months. With regard to cures, it is not the purpose of this paper to speak. That can be only done after years of watching the after-course of cases.

If one might venture to summarize, it would be thus: Our experience confirms the view that the administering tuberculin in the Out-Patient Departments of our hospitals is not only feasible and safe, but in well-selected cases is fraught with immense benefit so far as the symptoms of the disease are concerned, although with much less rapid alteration in the signs. The advantage to the patient of being guided by a positive subcutaneous test in doubtful cases is self-evident.

TUBERCULOSIS AND THE CHILD.[1]

By T. N. KELYNACK,

M.D., M.R.C.P.,

Medical Adviser to the National Children's Home and Orphanage; Hon. Physician to Mount Vernon Hospital for Consumption; Editor of "Tuberculosis in Infancy and Childhood," etc.

Tuberculosis is the great scourge of child-life. It desolates the home, ravages the school, and ruins much of the best efforts of the State. Tuberculosis is the most fruitful agent in the production of the debility, disease, crippling and death of our most promising sons and daughters. And if, as we say and believe, the desolations of this plunderer may be prevented, then we are under the most solemn and urgent obligations to struggle unceasingly for the final conquest of the Captain of the Children of Death.

The physical vigour, intellectual stability, and economic efficiency of the citizens of to-morrow depend upon the health and equipment of the children of to-day. Yet we continue slow to recognize the peril which threatens us, and are willing to remain content merely to experiment with weapons and machinery instead of entering with heart and mind into a campaign, which, however long, arduous, and expensive, shall safeguard our homes and offspring from the pestilence that walketh in darkness, the sickness that destroyeth in noonday.

The problem of the protection of infancy, childhood, and youth from tuberculosis is a national one, in the solution of which every man and woman should take a part. As the late Lord Lister well said: "If the prevention of tuberculosis is to be effectively carried out, the general public must aid the physician and surgeon in the endeavour." Every unit in the State must have a stake in this enterprise. We suffer individually and collectively, and collectively and individually we must be ready to sacrifice personal, professional, and temporary interests, in order that the highest good may be made possible for our children. In what must necessarily be a condensed and incomplete statement of the case for the tuberculous and the tuberculously-disposed child, I wish to limit consideration as far as possible to the medico-sociological and medico-educational aspects of the question. It will be wise, however, to draw attention to some few clinical facts and pathological views. A scientific basis must be found for our philanthropic endeavours and measures for national medical service, if we are to attain the greatest

[1] Substance of a paper read at the Biennial Health Conference and Exhibition, held at the Royal Horticultural Hall and Technical Institute of the London County Council, Westminster, Tuesday, June 25, 1912.

good for the greatest number, the maximum of benefit with the minimum of expenditure.

Clinical and Pathological Considerations.

Tuberculosis and a tendency thereto undoubtedly exists among the children of civilized countries to an extent not generally realized.[1] The disease occurs among the children of all ranks of society. No age is exempt. "It was formerly believed that the disease was rare in infancy, but recent observations have shown the opposite to be the case."[2] Intra-uterine infection may occur; it seems probable that congenital tuberculosis is really less rare than is generally taught. Certainly many women with pulmonary tuberculosis in extensive and sometimes advanced forms bear children. A large number of infants are infected in early life. Something like 40 per cent. of all children dying in public institutions under the age of fourteen, and submitted to autopsy, are found to be subjects of either acute or quiescent tuberculosis.

Most children seem peculiarly susceptible to the invasions of the tubercle bacillus, but in the majority of cases there is fortunately considerable natural powers of resistance. Even when there is well-established tuberculous disease, arrest and restoration to health is often secured.

It is well to keep clearly in mind in arranging for prophylactic measures and remedial procedures that a distinction must be made between tuberculous infection and tuberculous disease. Many children suffer infection without manifesting or experiencing evidences of serious disease. It is necessary to insist also that the clinical signs and symptoms of tuberculous disease in children, especially when the intra-thoracic organs, and particularly the lungs, are affected, differ often very markedly from the manifestations met with in adults. It is most important to realize that extensive tuberculous involvement may occur in children with but little complaint and but few evidences of the disorder. Tuberculosis in early life is a treacherous disease, and scientific scouting is often necessary for its detection. It would not be judicious on the present occasion to enter into a discussion on the relative frequency with which tuberculosis affects the various organs of the body. Neither would it be opportune to deal with the symptomatology of the disease. I wish, however, to urge that for practical purposes we

[1] For evidence consult "Tuberculosis in Infancy and Childhood: its Pathology, Prevention, and Treatment." Edited by T. N. Kelynack, M.D. London: Baillière, Tindall and Cox, 8, Henrietta Street, Covent Garden. 1908. Price 12s. 6d. net.

[2] "The Diseases of Infancy and Childhood." For the Use of Students and Practitioners of Medicine. By L. Emmett Holt, M.D., Sc.D., LL.D., assisted by John Howland, A.B., M.D. Sixth edition. New York and London: D. Appleton Company. 1911.

must not linger too long over mere refinements in diagnosis or academic discussion as to the precise seat, nature, and extent of the tuberculous lesion. By all means let our diagnosis be as accurate and complete as we can possibly make it; but when we have a manifestly sick child to deal with, we should not waste time by waiting for the carrying out of doubtful diagnostic tests, elaborate physical investigations, X-ray examinations, detailed microscopic inspection of sputum and the like. Nowadays too often valuable time is lost in unnecessary refinements. Let us be more energetic in catching our tuberculously-infected case early. I am glad to know that in some districts school medical officers are searching out their tuberculously-predisposed and early tuberculous school children, and are dealing with them on "anti-tuberculosis lines." This is a sane and business-like policy. Let me also add here a word of warning to those who hanker after some easily applied test, such as that of von Pirquet.[1] Interesting and serviceable as such tests may sometimes be, they have serious limitations, and should never be relied upon solely for classification or as ultimate guides governing diagnosis and treatment.

[1] As regards the application and utility of von Pirquet's tuberculin test for school children, the researches of Dr. Wimmenauer are of interest (see *Zeitschrift für Schulgesundheitspflege*, April, 1912. Abstract in the *Universal Medical Record*, July, 1912). Von Pirquet's test was applied to 236 school children in the Mannheim schools suspected of tuberculosis. A positive reaction was obtained in 136 children (57·6 per cent.) and a negative one in 100 (42·4 per cent.). The relation between the reaction and the family history is indicated by the following table:

Relations.	Reaction +	Reaction −
Both parents tuberculous	12 = 80 per cent.	3 = 20 per cent.
Mother only tuberculous	29 = 70·7 ,,	25 = 29·3 ,,
Father only tuberculous	40 = 61·5 ,,	12 = 38·5 ,,
Brothers and sisters only tuberculous...	3 = 100 ,,	—
More distant relations only tuberculous	9 = 42·8 ,,	12 = 57·2 ,,
Total	93 = 64·1 per cent.	52 = 35·9 per cent.

These figures seem to suggest that the closer the child is brought into connection with its afflicted relations the greater the chance of infection. With both parents ill, there is a positive reaction in 80 per cent.; with brothers and sisters tuberculous, 100 per cent.

The following table shows the connection between physical conditions and reaction:

Physical Condition.	Reaction +	Reaction −
Lungs normal	38 = 48·1 per cent.	41 = 51·9 per cent.
Changes in the apices	75 = 64·7 ,,	41 = 35·3 ,,
Bronchitis	19 = 54 ,,	2 = 33·6 ,,
Other conditions	4 = 66·6 ,,	2 = 23·4 ,,

Wimmenauer holds that the test presents a general picture of the diffusion of tuberculosis.

As to the sources of infection, it may safely be said that most of the tuberculous disease met with in childhood is home-born and home-grown. Undoubtedly, the infective agent comes from human sources in the majority of cases. Many believe that much of the tuberculosis met with in early life is of the bovine type and is contracted from imbibing tuberculous milk. Delépine goes so far as to declare that "not less than 25 per cent. of the children under five years of age suffered from tuberculosis of bovine origin."[1] Many reliable pediatricians believe, however, that tuberculous infection through milk is rare as compared with infection by the almost ubiquitous tubercle bacilli of human origin. So experienced a clinician as Professor Emmett Holt, speaking from a study of cases in New York, says: "My own observations lead me to the conclusion that only a very small proportion of children contract tuberculosis in these indirect ways. Infection through milk I believe to be relatively rare. Unless the disease in an animal is far advanced or the udder is involved, the number of bacilli present in the milk of a tuberculous cow is small, and the chances of infecting a child are slight. Those which enter may be destroyed in the stomach or pass through the intestinal tract without doing harm. Bacilli entering through the respiratory tract unfortunately have no such ready means of exit." Professor Holt's view certainly coincides with my own experience. While we should strive for the maintenance of adequate care and national control of our milk supply, I am convinced that, at least for the present, we should do well, especially remembering our restricted resources, to concentrate our attack on the widely prevailing and generally recognized sources of human tuberculous infection. This, in view of the new powers which have come to us through notification, medical inspection of school children, and now by means of the machinery of the National Insurance Act, is, I am convinced, sound policy, and, I believe, scientifically-directed wisdom.

The Tuberculous Child and the National School Medical Service.

Easily recognized tuberculosis occurs in a large number of school-going children. It must be presumed that manifestly sick children are, at least in the majority of cases, kept at home, either on the parents' initiative or following the advice of the private medical adviser or hospital doctor. But as the matter now stands it is estimated by Sir George Newman[2] that "according to the returns made by school

[1] See "Tuberculosis in Children," a paper read at the fourth Annual Conference of the National Association for the Prevention of Consumption; abstract in the *British Medical Journal*, June 15, 1912.

[2] See Annual Report for 1910 of the Chief Medical Officer of the Board of Education, p. 86. London: Wyman and Sons, Ltd., Fetter Lane, E.C. 1911. Price 1s. 3d.

medical officers, approximately 1 per cent. of school children—that is some 60,000—are suffering from tuberculous affections." And he hastens to add: "This number is undoubtedly too low an estimate, and if there were added to it all cases of acute tuberculosis (in hospital or elsewhere) and all tuberculous cases absent from school, or in special schools, the total number would be far higher."

The subject of tuberculosis and school children has been discussed at the International Tuberculosis Congress in Rome and at other recent Conferences. Dr. H. Mery, of Paris, has estimated that open-air schools are required for 4·25 per cent. of all school children.[1] Dr. R. W. Philip,[2] of Edinburgh, makes the startling statement that from his personal observation of the school children in Edinburgh at least 30 per cent. "presented evidence of tuberculosis determinable by ordinary clinical tests."

Certainly we are throwing away lives and money by our neglect to deal with our tuberculous and tuberculously-inclined school children. In London alone, during the last ten years, £327,185, or nearly £33,000 a year, has been expended in attempting to educate children who succumbed to tuberculosis, and Dr. Fairfield, who is responsible for this estimate, is of opinion that 90 per cent. of the loss falls directly on the public purse.[3]

If our anti-tuberculosis campaign is to be conducted on rational lines we must *concentrate on the children.* Let me say here that I believe much of the tuberculosis met with in school children has its origin prior to school-going age, and even when tuberculosis arises during the school period, it will generally be found to be dependent on a home infection. I do not think it likely that much actual infection occurs at school, but there can be no doubt that non-hygienic conditions of school life oftentimes arouse slumbering tuberculosis and increase the susceptibility of the soil to the fructification of the tuberculous seed. Sir George Newman has urged that we require information as to "(i.) how many children are actually infected with the disease; (ii.) how many children are living under such conditions as render them particularly liable to contract it; and (iii.) how many children are likely to be peculiarly susceptible to it by reason of the state of their health"; and he further points out that the two main points which require the consideration of Educational Authorities are (1) the establishment of a system for detecting children suffering, or likely to suffer, from tuberculosis, and the maintenance of complete records with regard to them; and (2) the

[1] See Report of Discussion on Tuberculosis and School Children at International Tuberculosis Congress, *British Medical Journal*, p. 961, April 27, 1912.

[2] Philip, R. W.: "Tuberculization and Detuberculization," *British Medical Journal*, p. 873, April 20, 1912.

[3] Fairfield, Letitia: "The Loss on Educating Consumptive Children in Ordinary Schools," *School of Hygiene*, No. 2, 1912: abstract in the *Universal Medical Record*, vol. i., No. 5, May, 1912.

practicability of introducing a system of treatment which shall be both preventive and curative in character. To attain this we shall have to elaborate our machinery for the detection of cases, not only in the school, but in the home, and must see that preventive measures and procedures necessary for effective treatment are available for children under school age.

Let me point out here that open-air schools, playground classes and the like, while serving a good purpose in teaching us the wisdom of a more natural and hygienic method of imparting instruction, are really only of limited service in dealing with tuberculous and tuberculously-disposed cases. It is of but little good to arrange for children to be hygienically managed for a few hours of the day during part of the week, when the major portion of their life has to be spent in close contact with tuberculous parents, brothers and sisters, or friends, in insanitary and overcrowded dwellings, and themselves often imperfectly nourished and subjected to other debilitating conditions of life. Residential schools are essential for many of these cases.[1] As is well known, sanatorium treatment for adults, as usually carried out in this country, with a limited period of residence and a return to home life and conditions of work such as led to the initial breakdown, has proved of but partial or temporary benefit in a considerable proportion of cases. And if we merely aim at establishing sanatoria or residential sanatorium schools, where children are to be sent for short periods of treatment, we shall most certainly be doomed to disappointment.[2]

National Insurance and the Tuberculous Child.

We are glad to know that an organized attack on tuberculosis is to be made possible by the provisions of the National Insurance Act. But it is well to realize at the outset that it will be but poor policy to make elaborate means for the restoration or alleviation of our soldiers of labour who have fallen in the conflict, if we forget and neglect to fortify and to train our young recruits so that they may be physically capable of filling up the ranks. While caring for the physically disqualified in the present, we do well not to lose sight of the necessity of safeguarding the future worker. The recently-issued interim report of the Advisory

[1] See "Residential Open-Air Schools for Delicate and Tuberculous Children." By D. M. Taylor, M.A., M.D. *The Child*, July, 1912.

[2] To illustrate this point, charts of cases, which have been under observation at the Harpenden Sanatorium of the National Children's Home and Orphanage, were exhibited. In the case of a boy it took something like nine months for the temperature to become stable, and yet ultimately he regained such health and strength as to be able to be treated as an ordinary boy. In the case of a girl, many months passed before the temperature became anything like settled, but ultimately the disease became practically arrested, and she was able to be treated as a fairly ordinary girl. On going home to her friends she rapidly retrogressed. It is only in such an institution as the Sanatorium of the National Children's Home, where children can be dealt with on hygienic lines for an indefinite period of time, that we can come to realize what "sanatorium benefit" as applied to tuberculous children may really mean.

Departmental Committee on Tuberculosis[1] clearly indicates this truth, and declares that "the more the resistant power of children is increased, the lighter will be the burden of tuberculous disease in the adults of the next generation." It is also pointed out that "Childhood affords an excellent opportunity for detecting and dealing with tuberculosis," and "the factors which tend to weaken the defensive powers of children can be brought under control easily and at an early stage."

But the means existing for dealing with tuberculous and tuberculously-disposed children are woefully inadequate:[2] "There is a certain amount of accommodation in voluntary and other institutions already existing for cases of pulmonary tuberculosis in children, and also a large number of beds for non-pulmonary tuberculosis. There are also about 180 places in open-air schools for tuberculous children, and 750 places in general open-air schools. In addition, there is a certain amount of miscellaneous provision in general and special hospitals."

The Astor Committee recommend that "children suffering from pulmonary tuberculosis should, whenever practicable, be sent to residential schools," and it is added that "the Committee are advised that some 250 additional beds for this class of case should be provided at the outset." As to cases with non-pulmonary tuberculous lesions it is stated that "children affected with osseous tuberculosis should be sent to residential sanatorium schools equipped with all necessary appliances for conservative surgical treatment. At present the accommodation for these cases is very inadequate. To begin with, at least 2,000 additional beds are needed." The suggestion that "glandular and other forms of tuberculosis should mainly be dealt with by means of open-air schools, play-ground classes, night camps," etc., seems to be advice which is not entirely supported by clinical experience. In fact, it must be admitted that probably none of us fully realize the extent, seriousness, and difficulties of the problem, and too many are content to follow the ancient and generally approved methods of symptomatic treatment, palliation, and partial relief rather than insist on organizing our efforts in accordance with scientifically directed preventive measures.

General Conclusions.

This paper has nothing to do with the pathological features of, and strictly medical procedures necessary for dealing with, tuberculosis in children. I am desirous of urging that the problem is a medico-sociological, a medico-educational, a medico-economic one. Unless we are willing to view the whole question with the widest-angled lens possible, we shall see but a very small part, and shall continue for the most to

[1] Interim Report of the Departmental Committee on Tuberculosis. London: Wyman and Sons, Ltd., Fetter Lane. 1912. Price 3d. For summary see BRITISH JOURNAL OF TUBERCULOSIS, Vol. VI., No. 3, July, 1912.

[2] Dr. Jane Walker in her paper on "The Tuberculous Child," read at the Conference of the Child Study Society, May 10, 1912, gives a list of institutions where tuberculous children are being dealt with in this country.

grope in uncertainty, and rest content to muddle along. We must recognize that tuberculosis in infancy and childhood is a manifestation of social disorder, economic distress, and sociological blundering, as well as debilitated and depraved inheritance, inadequate nurture, and hygienic lawlessness. Time will not allow me to furnish the abundant evidence which supports my contention. Let us remember, however, the outstanding facts of the case: "Fully one-fourth to one-third of the 1,200,000 [children born annually] are born to want and squalor."[1] As Rowntree[2] has shown, a family of five persons cannot possibly have their natural needs supplied on less than 24s. a week. According to Professor Bowley, of eight million men employed in regular occupation in the United Kingdom, over two and a half million, or nearly one out of every three earns less than 25s. a week. Let us remember, further, that at the all-important home-making, child-rearing period of life over one-third of all deaths are due to tuberculosis. Before establishing the sanatorium for our children of the National Children's Home,[3] it was found that "of the children who had died in the Home three-fourths had died of consumption, and that others had died from the same cause within a few years of their leaving us. . . . Of the children received during twenty years about 25 per cent. had lost one or both parents from the same terrible disease." I have recently analyzed the family histories of the first seventy-six cases admitted into our sanatorium for children at Harpenden, and although the information available was far from complete, I found that among the boys over 22 per cent. were known to be of a consumptive parentage, and 20 per cent. of the girls were known to have lost one or both parents from consumption. The problem of tuberculosis in childhood must be faced with a clear recognition of the importance of the influence of inheritance as well as that of environment.

We have much to learn yet regarding the real meaning of tuberculous infection, the dosage of the tubercle bacillus, its virulence, susceptibility of tissues, natural and acquired immunity, the rôle and value of tuberculin and the like—and until more light is available we do well to abstain from all dogmatism in our teaching, and disclaim any approach to finality in our measures for prevention and arrest. We believe and must teach that tuberculosis is a preventable disease, and that "what civilization has caused, it is under the most solemn obligation to cure"; and of this we may be certain, no extermination of the Great White Plague is possible so long as we remain content to sacrifice our children at the Shrine of the Destroyer.

[1] Money, L. G. Chiozza: "Riches and Poverty." Third edition. Pp. 160. London: Methuen and Co. 1906.

[2] Rowntree, B. S.: "Childhood and Poverty," *The Child*, August, 1912.

[3] See statement by the late Rev. Dr. Arthur E. Gregory, D.D., in the First Annual Report of the Harpenden Sanatorium in connection with the National Children's Home and Orphanage. London: The National Children's Home. 1912.

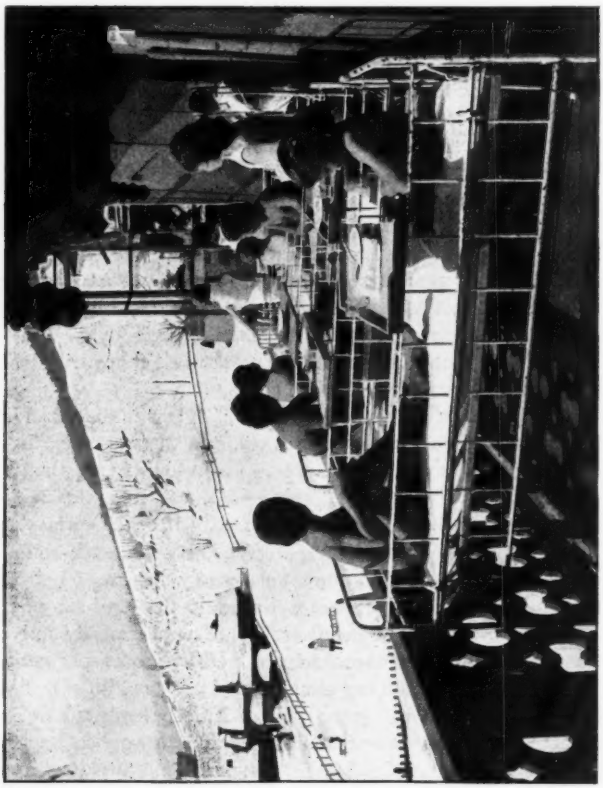
HELIOTHERAPY OF TUBERCULOSIS IN SWITZERLAND.

By ARNOLD C. KLEBS,
M.D.,
Editor of "Tuberculosis: A Treatise by American Authors."

In reply to the editor's request for a short communication on heliotherapy in Switzerland, I venture to send this concise statement as to what is being accomplished. The charm of Greek etymology of late permits the scientific discussion of an important adjuvant in a treatment which has been practised here in the Alps for some time. We are just now celebrating the two-hundredth anniversary of Rousseau's birth, and that naturally leads our thoughts to this early apostle of Nature. The citizen of Geneva, in his enthusiastic advocacy of sun-baths, in his plea of "back to Nature," did not trouble much about optics and other underlying scientific laws, although near him, on the border-line of France, sat Voltaire, who had tried to introduce Newton to the French.

It is so different now, and "old Sol's" glory is dissected into red and ultra-red, violet and ultra-violet rays, and the wave-lengths of his golden threads are carefully measured. Even heliotherapy has become analyzed and divided into thermo-, chromo-, and actino-therapy. Rousseaunian periods have, however, existed before; a certain stage of civilization apparently calls for them. We know of the sun-worshippers in remotest antiquity. Herodotus specifically speaks of heliotherapy in Egypt, and also Hippocrates, Celsus, and the Arabian physicians insist on the sun's rays' beneficial action. The chemically active rays, however, are absorbed to a considerable extent (to 42 per cent.) by a humid atmosphere—hence dry climates and greater altitudes have the largest available supply of them. This naturally leads one to Switzerland, where probably the first successful modern application of heliotherapy was undertaken by Dr. O. Bernhard in the sunny mountain valley of the Engadine. He found in 1902 that a burst abdominal wound, which would not heal under ordinary treatment, assumed almost immediately a better aspect upon exposure of several hours to the sun, and closed quite rapidly thereafter. This led to further trials, particularly on surgical wounds, with identical results. About the same time, others (Müller, Wagner) had tried successfully to expose such wounds simply to the open air. Reverdin, in Geneva, was probably the first to transfer his patients directly from the operating-room to the hospital

garden. The promotion of exsiccation, then considered the principal beneficial feature in these attempts, was soon found to become intensified in the sun and particularly in high elevations. But, of course, for modern science exsiccation was not a sufficiently embracing explanation, and the chief virtue of sunlight was thought to be in its bactericidal effect. Since 1877 (Dawnes and Blunt) such an effect on micro-

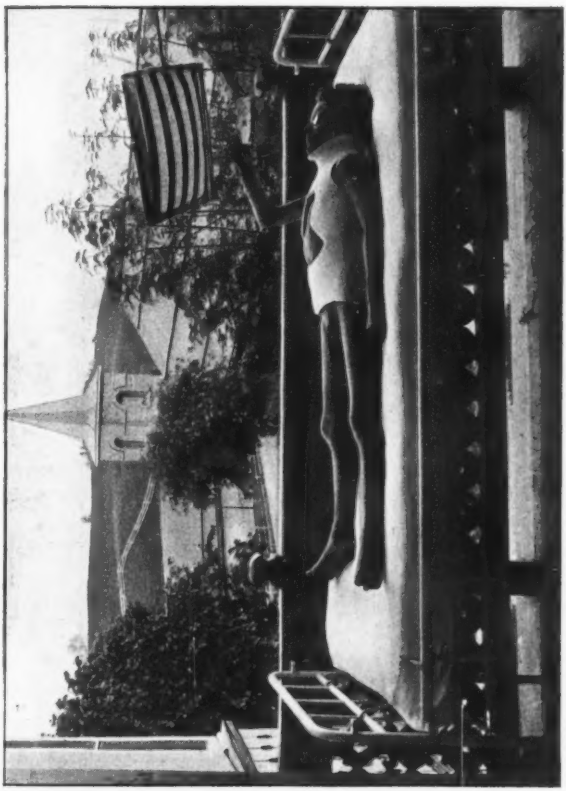


HELIOTHERAPY AT LEYSIN.

organisms had been experimentally demonstrated by several observers. Later Koch brought the tubercle bacillus also within the range of these experiments; Migneco and others showed by very interesting experiments that this most resistant bacillus does not evade the destructive influence of sunlight. Hence Rollier, who took up Bernhard's work, based his results chiefly upon the antiseptic action of sunlight.

Whatever may be the active agent in sunlight, its activity, rapid

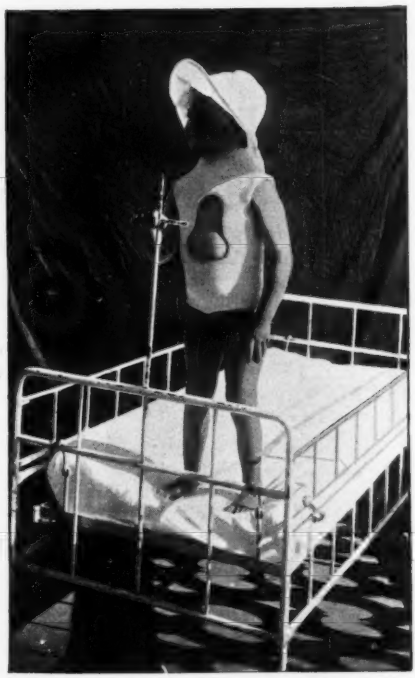
and reliable, cannot any more be doubted after the exhaustive demonstrations made particularly by Rollier at Leysin. Anyone who makes a trip in midsummer or midwinter through that part of the Vaudois Alps may witness some interesting scenes, such as would have brought joy to Rousseau's heart. Out on the green grass, or in deep snow on skis, he will behold among a matchless scenery of Alpine peaks, above



TREATMENT OF A TUBERCULOUS CHILD AT LEYSIN BY HELIOTHERAPY.

which towers in all its glory the Dent du Midi, flocks of merry children in most unconventional garment, or better, without any, playing, dancing, and gesticulating. These are Rollier's convalescents, most uninteresting to the medical visitor, for they seem to enjoy a rarely seen exuberance of good health. A visit to the two or three charming châlets, known as Dr. Rollier's "Clinique pour le Traitement des Tuberculoses Chirurgicales," may at first seem disappointing to the confrère who has

made his round of modern hospitals, because these châlets have not even the smell of the famous surgical institutions. Their interior, like their exterior, fits admirably into the glorious landscape; immaculate cleanliness everywhere; everything useful and purposeful by simplest means. The visitor in addition, however, will find plentiful evidence that an up-to-date surgeon has had the guiding hand everywhere. But the sun is the head surgeon, and the main operating-room the



A TUBERCULOUS CHILD AT LEYSIN: "THE WINDOW."

open verandas upon which are numerous beds, with their small patients not in but on them in complete nudity. All shades of pinks and browns may be observed, and in every face a most evident satisfaction with this kind of treatment. Dr. Rollier's success in cases of surgical tuberculosis is, however, not accomplished solely by exposure to the sun; every other physical means is used to expedite a cure. In Pott's disease, for instance, and other joint tuberculosis, he insists on complete immobilization in the recumbent position until local foci are healed. The thus enforced rest, together with continuous extension

sometimes in plaster of Paris bandages, with "windows" to allow insolation, offers conditions most favourable to an arrest of the trouble. Such immobilization, which without exposure to air and sun usually depresses the general condition, have here the contrary effect, and, once released, the children very rapidly can again enjoy the use of their limbs.

The children are adapted very gradually to these exposures. It is, however, extraordinary how rapidly this is possible, and on their return home no dangerous relapses are observed. The adaptability of the child's organism is very remarkable, and for that reason it must seem plausible that the most enduring results are to be achieved in childhood. An adult similarly treated by sun-baths has always much greater difficulty in adapting himself later to ordinary home conditions.

One would be wrong in assuming that the beneficial effect of this sun treatment is solely exerted by an influence on the general condition. It is doubtless true that the sun's rays exert also a most powerful local activity. Thus the anæsthetic effect is often quite astonishing, particularly in arthritis, after the first insolation. The same is observed in peritonitis and cystitis; most remarkable is the dissolving effect on glandular swellings, so that very often they disappear spontaneously.

It would lead beyond the scope of this article to enumerate all the protean manifestations of tuberculosis which are benefited by the method. Success is certain and comparatively rapid in all cases of closed tuberculosis. When through operation or neglect a closed tuberculosis is transformed into an open one, even then excellent results are obtainable, but it is a tedious process and one fraught with danger. Nowhere like in children's tuberculosis is early diagnosis and appropriate conservative treatment to be viewed as an effective insurance of their future welfare. This particularly since a healed tuberculous lesion in childhood confers a marked degree of immunity against other tuberculous manifestations in later life. Dr. Rollier excludes from his clinic children with pulmonary tuberculosis, because they are always cases of open tuberculosis, requiring different management not included in his programme.

Around this first institution there have sprung up others, through Dr. Rollier's initiative, where the well-to-do can benefit by similar methods. They fulfil the requirements of modern science in the way of comfort and aseptic architecture. I would have to begin over again were I to describe them. For to-day my intention is only to call attention to a most original attempt to deal with one phase of tuberculosis, which to my mind should induce further investigation and widespread imitation.

[We are indebted to the courtesy of Mrs. Gertrude Austin and the publishers of *The Child* for permission to reproduce the illustrations accompanying the article on "Heliotherapy for Tuberculous Children" in *The Child*, July, 1912.—EDITOR, *British Journal of Tuberculosis.*]

A NOTE ON THE USE OF GRUNDT'S MASK IN THE EXAMINATION OF TUBERCULOUS PATIENTS.

By Dr. E. GRUNDT,
Medical Superintendent of the Lyster Sanatorium, Norway.

In the British Journal of Tuberculosis for January last there appeared a note and illustration of a simple face-mask to be used during the medical examinations of tuberculous subjects. I think a supplemental note may be of interest regarding a form of mask which I invented about two years ago.

Most physicians who have been called upon to deal with tuberculous patients will, no doubt, have often found it undesirable to be in close proximity to the patient under examination during a fit of coughing. Every medical man must have felt the expiratory air sweep past his cheek and nose during such a medical investigation. The danger of this is apparent when viewed from a hygienic point of view. The doctor in such cases, according to Flügge, is especially exposed to the danger of infection. This opinion has been endorsed by the results of investigations undertaken by B. Fränkel,[1] Moeller,[2] and Roepke,[3] and others.

Moeller undertook seventy-five tests of the nasal contents of his own nose immediately after his examination of lung and throat cases in the Brehmersche Heilaustalt in Górbersdorf. He then found on various occasions from one to eight tubercle bacilli lying close together.

Roepke examined two masks, which during chest-examination had been placed over the mouths of two patients with moderately advanced tuberculosis of the lungs, and in them he found tubercle bacilli. In one mask he found a small particle of sputum, in which were found several tubercle bacilli. Material from masks was also placed in bouillon, and a suitable temperature maintained, and he then found that tubercle bacilli had developed. These observations show conclusively that there is real danger of the direct infection of the examining physician.

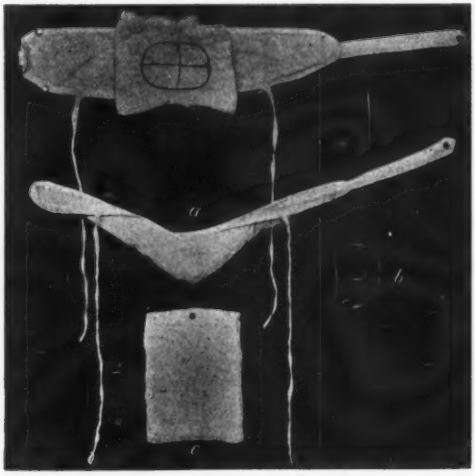
Many authors have also pointed out that there is considerable

[1] Fränkel, B.: "Zur Prophylaxe der Tuberkulose," *Berl. klin. Wochenschr.*, 1899, No. 2. "Zur Tröpfcheninfektion der Tuberkulose und ihre Verhütung," *Zeitschr. f. Tuberkulose u. Heilstw.* Bd. I., p. 5.

[2] Moeller: "Zur Verbreitungsweise der Tuberkelpitze," *Zeitschr. f. Hyg. u. Inf. krankh.*, 1899.

[3] Roepke: "Die Aulage u. Führung d. Krankenjournals in d. Heilstätte Belzig," *Zeitschr. f. Tuberkulose u. Heilstw.* Bd. II., p. 333.

likelihood of the consulting-room, where the examination takes place, becoming infected during the chest examination of a tuberculous subject, especially when the patient is coughing without control. Recognizing these facts, several doctors have constructed masks suitable for absorbing the infecting germs exhaled by the patient. It is true that Saugmann[1] has tried to prove that lung and throat specialists but "very rarely" become tuberculous themselves. It seems, however, impossible to doubt but that infection may take place during a protracted clinical examination, especially when there is much coughing and where no protective mask is employed.



GRUNDT'S MASK.

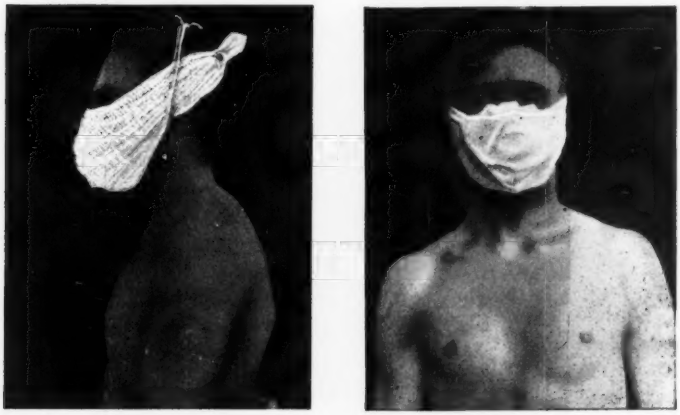
B. Fränkel[2] has described a mask which tuberculous patients can wear on all occasions. The mask consists of a nickel-plated wire-wove muzzle, covered with a piece of flannel, gauze, or such-like material, and resembles closely a chloroform mask. This mask, however, only covered the mouth, and could not prevent the secretions from the nose from being scattered.

Sigismund Cohn[3] has described a mask for the use of policlinic patients. It is made of a special kind of stout porous paper. The paper is cut into rhombic pieces and folded into the shape of a muzzle.

[1] Saugmann: "Zur Frage der Bedeutung der Tröpfcheninfektion für die Verbreitung der Tuberkulose" von Prof. Chr. Saugmann, *Zeitschr. f. Tuberkulose u. Heilstw.* Bd. VI., p. 125.
[2] Fränkel: *Berl. klin. Wochenschrift*, 1899.
[3] Cohn, S.: *Zeitschr. f. Tuberkulose u. Heilstw.*, 1900, p. 467.

In order to give the mask greater firmness and make it a better percolator, the paper is doubled. The mask covers both chin and nose. The ribbons are passed above the ears and fastened at the back of the head. The mask has an advantage over that of Fränkel's, in that it covers both mouth and nose, and its cheapness makes it possible to use a fresh mask for every new patient.

Neither the mask of Cohn nor that of Fränkel fits sufficiently closely to the face. When the patient breathes, these masks expand, and allow of an opening between the mask and the face, thus leaving opportunity for the free passage of unfiltered air. By using Fränkel's mask one always feels the patient's breath at the back of one's head during the stethoscopic examination. Consequently the masks men-



GRUNDT'S MASK, USED IN THE EXAMINATION OF TUBERCULOUS PATIENTS.

tioned have not been much used. Fränkel's mask is still used at a few sanatoria, such as Belzig[1] and Lyster, to prevent the infection of the medical examiner. In order to be quite satisfactory, a protective mask must comply with the following requirements: (1) It must be close-fitting; (2) it should be porous, and allow of thorough filtration of the air; (3) it must be inexpensive. The mask here described almost perfectly meets these demands. The mask consists of three pieces—(1) A bandage of thick linen; (2) a nickel-plated wire skeleton in the form of a muzzle; and (3) a sheet of wadding covered with a single sheet of gauze. The general characters are shown in the accompanying illustrations.

The bandage forms the mask; the wadding keeps back the expired

[1] See "Die Aulage und Führung des Krankenjournals in der Heilstätte Belzig," by Dr. O. Roepke, *Zeitschr. f. Tuberkulose u. Heilstw.* Bd. II., p. 332.

air, stops the openings between the bandage and the face, and is at the same time so porous that the patient can breathe comfortably. The sheet of gauze round the wadding makes the latter fit firmly, and it is less dusty than other contrivances. The wire skeleton keeps the bandage and the wadding well out from the mouth, so facilitating easy respiration, and lessens the rebound of the expiratory air from the mask. The bandage is made to cover chin, mouth, and nose, and it has a broad, strong band with a clasp to fasten at the back of the head. To the lower edge on either side is fastened pieces of tape, which are tied on the top of the head or farther back, whichever is most convenient. The band across the back part of the head tightens the bandage backwards; the band across the top of the head tightens it against the lower jaw and stops openings at the back. The wadding stops other possible openings. It is most difficult to prevent the expired air from escaping on both sides of the nose. In order to leave sufficient of the wadding for stopping, it must project somewhat over the upper edge of the bandage; then it is pulled forth from both sides and stopped firmly after the mask is placed on the patient. It sometimes happens that the bandage does not fit accurately, and allows the mask to gape upwards or in front. This may be improved by twisting the band across the back of the head and then tightening it. The upper edge of the bandage may also be turned down until it tightens sufficiently against the face. The mask must be adapted to meet the requirements of each face.

To the question, Does the mask render breathing difficult? the answer can be given: Not much; only occasionally in an advanced case with dyspnœa does it hinder the respiration sufficient to cause discomfort. In some instances a protracted examination cannot be undertaken with the mask on. It should also be noted that pneumothorax patients sometimes feel a little oppressed when wearing the mask, but not to such a degree as to contra-indicate its use. The price of bandage and skeleton should not be more than 2s. 6d. The bandage can easily be made.

The size of a sheet of sterilized wadding is 15 × 19 centimetres. It is to be cut from the ordinary sheets of wadding. The sheet of wadding costs about 1·28 öre, the gauze about 2 öre, altogether 3·28 öre (a halfpenny). This is certainly not a large expenditure. The gauze may be used for two or three times after being sterilized and ironed. The wadding must be destroyed. The bandage and wire skeleton are sterilized after use. Applied in the right way, Grundt's mask undoubtedly renders valuable protection for the examining doctor. By its aid he is rendered safe against infection, and he is spared the unpleasantness of experiencing the patient's breath impinging upon his face while examining with the ordinary stethoscope.

Patients themselves have no objection to the mask. I have now used it for some time, and my experience is that patients seem to find the mask more comfortable after having had it on once or twice. It is quite probable that, as Roepke[1] points out, the "cultivating influence" is of importance. The person who has been accustomed to the use of the mask in the sanatorium will quite naturally make use of his pocket-handkerchief, and holds it before his mouth when coughing, after he returns home. Grundt's mask can easily be employed in private practice, although there are difficulties in using it systematically. But there can be no doubt but that the mask, especially in private practice, will be of great importance through its "cultivating influence." I trust these few notes will lead many physicians to try it.

OUTDOOR LIFE FOR TUBERCULOUS CONVALESCENTS IN AMERICA.

By EDWARD CUMMINGS,
M.D.,
The Hinton Hospital, Hinton, West Virginia, U.S.A.

PEMBROKE. His Highness yet doth speak: and holds belief
That, being brought into the open air,
It would allay the burning quality
Of that fell poison which assaileth him.
PRINCE HENRY. Let him be brought into the orchard here.
KING JOHN. Ay, marry, now my soul hath elbow room.
SHAKESPEARE: *King John.*

EXTREMES of all kinds are avoided in the specialized treatment of delicate patients; heavy forced feeding is a thing of the past; drugging is done with, and even the heroic ideals about fresh air have mellowed down into something gentle and humane. To-day the cure in America, as practised in the best sanatoria, is simply a heightened hygiene, a return to rational and normal conditions, under a kindly but inflexible discipline. This, at least, is the view taken by the group of physicians at Saranac Lake, in the Adirondack Mountains, where Dr. Trudeau, the beloved pioneer of this work in America, began his great experiment in 1875. Dr. Trudeau, himself a tuberculous subject, was a great lover of the woods and the sports of field and stream, and his idea of getting back to Nature has been the dominant motive of the work that he and his friends (Dr. Baldwin, Dr. Brown, and others) have accomplished at

[1] Roepke: *Zeitschr. f. Tuberkulose u. Heilstw.* Bd. II., p. 334.

Saranac—a work which has profoundly influenced every American worker in the field. Not merely in methods has this influence been felt, but in altruistic principles and noble ideals. It is not considered that the physician has succeeded with his patient unless he brings him fully within his psychic control, and exerts an influence that will mould the fashion of his after-life. The life in the sanatorium is like going to a military college; it is, in a sense, a preparation for a life of warfare against the cunning enemy, who, like Fuzzy-Wuzzy, is

> "All 'ot sand and ginger when alive,
> And 'e's generally shammin' when he's dead!"

The after-life of "graduates" of sanatoria, and patients who have passed out of the immediate care of tuberculosis specialists, is often picturesque

AMONG THE PINES IN THE WESTERN STATES.

and interesting. Armed with the knowledge gained in their sanatorium life, and acting under specific instructions, they go forth to "clinch" their cures. Some of them are hardy incipient cases, discharged as apparent cures, and allowed much liberty; others are merely arrested cases, who have learned in the "san" how to live the tranquil life best suited to their limitations; others are fretful idlers, born neurotics, who require a more or less active outdoor life to sweeten their dispositions. Out into the hills and the woods and the sun they all go, living in the open, day and night, and building shacks and tent-houses and bungalows. Provision is made for a service of well-cooked food, with the usual complement of eggs and fresh milk. Long canvas chairs, willow lounging chairs, hammock couches, cushioned reclining chairs, and

every conceivable sort of convenience for resting are found furnishing these habitations. Some of these camps are quite luxurious, especially those in the Adirondack Mountains.

The outdoor life for convalescent tuberculous patients in the Saranac Country, and in North Carolina, Massachusetts, Pennsylvania, California, Colorado, and the South-West, can be made sufficiently varied. All the gentler sports are followed—walking, riding, driving, fishing, and shooting in the summer ; and in the winter, tobogganing, sleighing, skating, and mountaineering. Violent sports are rarely permitted. There are open-air workshops for carpentering, bookbinding, photography, basket-weaving, and all arts and crafts. Farming and

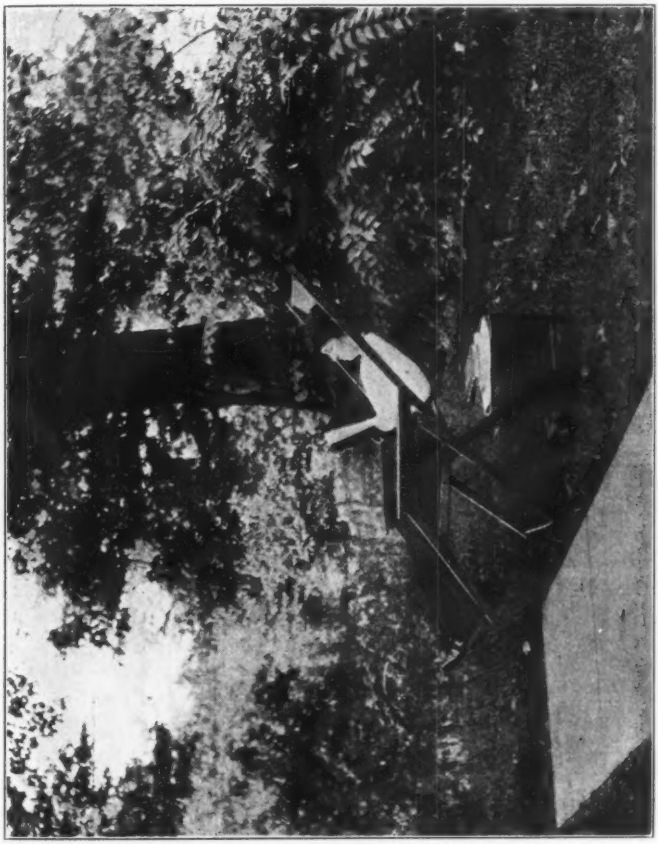
A TUBERCULOUS PATIENT'S TENT-HOUSE.

gardening, and graduated labour at digging and trenching are prescribed for selected cases. Kodaking, bird-study with the opera glass, botanizing, geologizing, and sketching and painting are followed by those to whom these things bring pleasure and profit.

In the arid regions of the South-West, a part of the Great American Desert, there is little rain except in summer. In this section (Arizona, New Mexico, Western Texas, and parts of California and Colorado) the winters are temperate, with a brilliant and constant flood of sunshine. The dryness of the atmosphere in those parts attracts many patients from the East, and many of these find the "tent-house" a comfortable and sanitary dwelling. There are those who assert that the dry and sunny atmosphere of the desert is in itself a specific, but the ablest of the South-Western specialists in tuberculosis do not make any broader claim for their climate than to point to the obvious fact that fine and fair weather makes the outdoor life an easy, natural, and

pleasant way of living: in other words, here or elsewhere, a selected climate offers a valuable adjunct to the sanatorium method of treatment.

Whatever the virtue of the Western climate, the whole South-West, from Denver to the Rio Grande, and from Texas to the sea, is

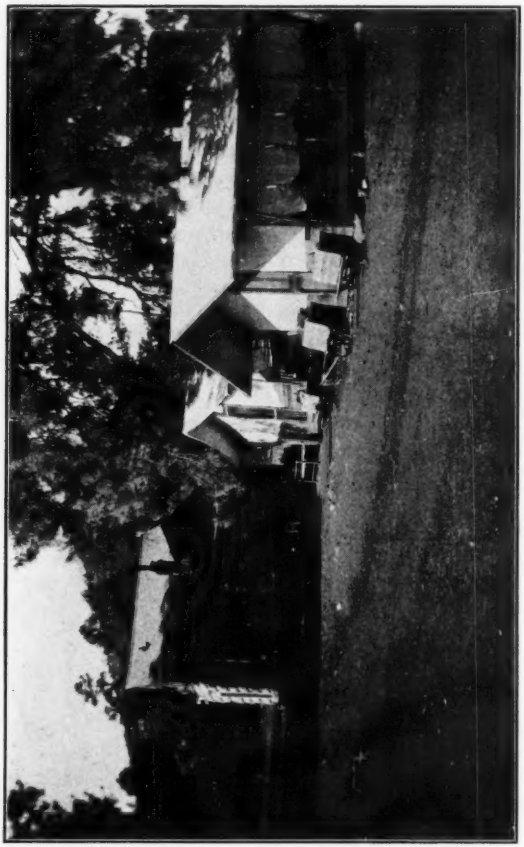


TAKING THE CURE IN SUMMER IN WEST VIRGINIA.

dotted with the canvas dwellings of health-seekers. An ordinary tent is stretched upon a frame of studding and rafters, the walls being about 6 feet high. Above it an extra large fly, made to project several feet all round, protects the interior from sun and storm. The sides are boarded up for 3 or 4 feet, and the space above this is screened with wire gauze. The canvas walls of the tent may be let down over this

space, but they are usually kept rolled up. The tent-house is floored, and is very comfortably furnished.

On a ranch near Silver City, New Mexico, a few "graduates" had put up tent-houses such as I have described, in order to continue the outdoor life. Some had been in the Adirondack Cottage Sanatorium, in New York; some had been patients at Nordrach Ranch, in Colorado



TENT-HOUSES ON A RANCH IN NEW MEXICO.

Springs; some had come from Dr. Bullock's Sanatorium, in Silver City; some had been patients under specialists in Philadelphia. It was a desert highland country of pines, live-oak, and juniper, and the industry of this particular ranch was raising Angora goats. Boarders were acceptable to the ranch-folk simply as company, for the place was wild and lonely, and here, amid noble pines, their guests

lived a free-and-easy life. One tramped the woods with a gun in pursuit of pigeons, or wrote short stories lying in a Kalamazoo reclining chair. One was a helper on the ranch, and milked the cows and packed supplies on burros to the goat-herders in the hills. One was still under absolute rest orders, and lay in his cot in the open air day after day, listening to the everlasting wind in the pines, or to the stories his wife would read to him, or telling still better stories of his own. One was a big man, with a mighty girth and the port and complexion of a sea-captain, who used to have terrific hæmorrhages; he used to drive to Silver City and back again, and in the interim filled the camp with jovial good-fellowship. One was a mighty hunter of wild cats before the Lord, and kept a pack of hounds. The manager himself was tuberculous, a man with a delicate frame and a desperate lesion, who took his illness as a part of the day's work, giving certain hours to rest and certain hours to business, and never once complaining of his luck. The meals were served in a log house by a Chinaman, and naturally they were such as might suit the tuberculous, with lots of roast lamb (which was really kid) and great pitchers of milk. One man, who had German ideas of superalimentation, drank a full gallon of milk daily, not for a month, but for years! Such forcing would eternally damn the average American stomach, but this man said he owed his life to the cow, for he got well. Over all was the spell of the desert. For thousands of miles the plains and mountains, vast and utterly lonely, slept in sun and silence, filled with elemental dangers and primeval mysteries.

This sketch of the outdoor life is only a sample. It can hardly assume to be even typical of all that wide and varied American outdoors which calls in so many ways to the tuberculous invalid to come and get well.

SANATORIUM BENEFIT FOR TUBERCULOUS PATIENTS, AND NATIONAL INSURANCE.

By WILLIAM J. HOWARTH,
M.D., D.P.H.,
Medical Officer of Health for the County of Kent.

The National Insurance Act necessitates Insurance Committees making arrangements for the treatment of insured persons who are suffering from the various forms of tuberculosis. The Astor Committee, which was appointed to consider how this requirement could be best carried into effect, strongly advised that the Councils of counties and county boroughs should prepare schemes, in which not only insured persons, but the remaining members of the community, might be able to participate. The Kent scheme, like that of other County Councils, has been framed on the lines recommended by this Committee, and a short reference to the main outlines may not be without interest.

The population of the Administrative County of Kent exceeds one million, distributed over an area of some nine hundred thousand acres. The density of the population varies between most rural and exceedingly dense urban. The county has been divided into seven areas for tuberculosis dispensary purposes, in each of which there will be a main dispensary, with several auxiliary centres. Particulars respecting the population, acreage, incidence of, and deaths from, pulmonary tuberculosis in these areas, are indicated in the following table:

Dispensary District Number.	Population.	Acreage.	Number of Cases of Pulmonary Tuberculosis notified during the First Six Months of 1912.	Deaths from Pulmonary Tuberculosis in 1910.
1 ...	160,006	107,932	212	101
2 ...	149,470	56,098	147	105
3 ...	145,216	63,707	195	131
4 ...	136,637	173,038	107	102
5 ...	163,340	101,441	334	164
6 ...	122,597	272,673	191	120
7 ...	168,395	196,938	269	137

It is hoped that these tuberculosis dispensaries will centralize all knowledge regarding tuberculosis in the particular areas, and that the

fullest use will be made of them by medical practitioners for consultation work in respect of diagnosis and treatment. A further important function will be that of the detection of unsuspected cases.

It is probable that four tuberculosis officers will be appointed to work these areas, helped by an adequate number of assistants. The chief tuberculosis officer will organize the work in the area to which he has been allocated, and in the main will act as a consultative and advisory officer. As a matter of detail, an attempt will be made to insure that each person attending for treatment shall be properly recommended. Admission will therefore be somewhat as follows: (1) Persons who are in a position to pay, by request of the medical attendant. (2) Insured persons, by agreement between the tuberculosis officer and the doctor in charge of the case. (3) Poor Law patients, on the recommendation of the Poor Law medical officer. (4) Uninsured persons who cannot afford to pay a general practitioner for a long-continued course of treatment, but who are not pauper cases, on the recommendation of the local medical officer of health.

Each tuberculosis officer will have at his disposal the services of a clerk, and sufficient nurses to help in the visitation of the cases and in home treatment.

Sanatorium beds, it is proposed, shall be provided by means of a central sanatorium of 100 beds, and in the seven dispensary areas it is further proposed to arrange for a total of 105 hospital beds—*i.e.*, an average of fifteen in each area. Each group of beds will be conveniently situated in the area. Treatment of the patients occupying these beds will be under the supervision of the tuberculosis officer, though it is not expected that he will have the responsibility of daily treatment or the control of administrative details.

A form of revolving shelter has been designed, and a supply will be provided by the County Council. These will be loaned to tuberculous patients where the surroundings of the house are such that they can be used with reasonable hope of success, and where the nature of the disease is such that treatment in an open-air shelter is indicated as being desirable.

Domiciliary treatment of insured persons will be undertaken by arrangements entered into between the Insurance Committee and the general practitioners in the county; and, as regards these cases, the services of the tuberculosis officer will be available for consultation, and such other professional assistance as he may be in a position to give to the doctor in charge of the case.

The nurses will receive instructions from the doctor in charge of a case, and they will also be of service in what may be termed the educative part of the work. In those urban districts where a health visitor is already engaged, it is hoped that her services will be avail-

able in that area for the purposes of home visitation. Attempts will be made to co-ordinate the existing preventive measures of the various Public Health departments with the new work, and the closest co-operation will be arranged between the tuberculosis officer and his nurses and the district medical officers of health.

The county laboratory, which is well equipped, will be used for all bacteriological work and for the preparation of dilutions of tuberculin. The bacteriologist, who will be responsible for this branch of the work, will be encouraged to take some degree of interest in the clinical work, and he will also be available for such research work as the tuberculosis officers consider it advisable should be undertaken.

During the first year purely temporary arrangements will be in operation, but these will fit in with the more or less complete scheme which has been devised on the above lines. Attempts will be made to give early and practical effect to sanatorium benefit by arranging—(1) that a number of beds in existing sanatoria shall be available for suitable cases; (2) for the supply of tuberculin in such cases as it is recommended; (3) for the provision of open-air shelters; and (4) for expert assistance to be available in respect of treatment and diagnosis.

CRITICAL REVIEWS.

TUBERCULOSIS DISPENSARIES.

By HALLIDAY G. SUTHERLAND,
M.D.,
Medical Officer to the St. Marylebone Anti-Tuberculosis Dispensary,
Editor of "The Control and Eradication of Tuberculosis."

A TUBERCULOSIS dispensary being the central unit in the Edinburgh system for the control and eradication of tuberculosis, its measure of success is dependent upon the degree to which the work is co-ordinated with the other units in that system—the sanatorium, the farm colony, the hospital for advanced cases, and the open-air school. The first tuberculosis dispensary in the world was founded in 1887 at Edinburgh by Dr. R. W. Philip, to whose great initiative and devotion to this cause is due the genesis of a perfect anti-tuberculosis organization. This has been widely adopted at home and abroad, and its essential principles are to be found in the recently-published Treasury Committee's Report on Tuberculosis, intended to serve as the model for the development of this movement throughout the kingdom.

The first principle of the dispensary system is *prevention.* It is not possible to over-accentuate this, for the danger is ever present that the immediate treatment of the individual, which appeals most to those of little imagination, should overshadow the larger issue of checking the disease at its source. No institution waiting for patients to come for treatment, no matter how scientific or specific that treatment may be, can hope to succeed along the line of eradication. Tuberculous infection is most frequent in childhood, from which period of life the malady may lie latent to break out as aggressive disease in later years. Every active case of tuberculosis must therefore be regarded as merely one unit in an infected group, the other members of which must be sought for. This is to be attained by a "march past" of the contacts—all those who have been living in relation to the original patient. Such a method of attack is based on a realization of two of the three determining factors of life—function and environment. Heredity may be ruled out at once as so much loose thought which has been permitted for too long to confuse the issue. Tuberculosis, even *in utero*, or even in the ovum, is a modification not a variation, and is therefore not transmissible in the biological sense. The question of the transmission of a predisposition is too involved to be here entered upon, but in the

opinion of the writer such does not exist. The practical application of the above factors is as follows: Over 70 per cent. of the whole population has been infected with tuberculosis at one time or another. Of these only a relatively small proportion succumb to the disease. If the function and environment of the individual be rendered antagonistic to the disease, the latter will be aborted. As Professor Sir Clifford Allbutt has truly said, many patients recover from pulmonary tuberculosis under the eyes of the profession, neither patient nor doctor being aware of the nature of the malady. If, then, the infected individual be diagnosed early, the application of the principle of pure air, great in its simplicity, a change from the physiological to the unphysiological, will in many cases achieve an arrest of the disease. This can alone be attained by the dispensary system.

With regard to tuberculin, in favour of which an enterprising campaign has been carried on in the lay press, it may be said at once that while it represents in the individual case our most invaluable adjunct to treatment, its place in the field of prevention is very strictly limited. As a diagnostic agent it is qualitative not quantitative. It is outside practical politics to inject 70 per cent. of the population with tuberculin. Its value as a prophylactic agent has yet to be proved. Thanks chiefly to the brilliant work of Béraneck and Sahli, we are beginning to gain some scientific idea of its mode of action, in contradistinction to blatant empiricism. It is only necessary, very necessary, to add that it is used at all tuberculosis dispensaries, where in selected cases most excellent results have been obtained.

Three reports of tuberculosis dispensaries have recently been issued in the boroughs of Paddington, St. Marylebone, and Bermondsey. The report of the Paddington Dispensary, by Dr. D. J. Williamson, has for its frontispiece a map of London, showing how from the first dispensary in Paddington the chain of dispensaries has now within the short space of three years encircled the greater part of London—St. Marylebone, Kensington, Fulham, Battersea, Camberwell, Woolwich, Poplar, Stepney, and Bermondsey. This is due to the great success which attended the work of the Paddington Dispensary, and to the initiative of the Central Fund for the Promotion of Anti-tuberculous Dispensaries in London. It is not possible to do justice to the Paddington report in the space at my disposal, but an idea of the work may be gathered from the fact that in the first three years of its existence, 4,162 patients have been examined, while the subsequent visits of patients in 1911 numbered 12,762. Of the 2,038 new cases in 1911, 40·73 per cent. were diagnosed as definite pulmonary tuberculosis, while 26·6 per cent. were regarded as suspected cases. It is of considerable interest to note that if these figures be added they represent 67·33 per cent. of definite and suspected cases, while at my

own dispensary (St. Marylebone) in its first year 65·8 per cent. of 690 new patients were diagnosed as pulmonary tuberculosis. The approximation of these figures is less remarkable since the methods used at both dispensaries are those taught by Dr. R. W. Philip of Edinburgh. Both the above reports contain a detailed account of the work of the open-air schools associated with each, representing a most important aspect of the whole movement. In the Bermondsey report by Dr. Robert Govan, there is an excellent exposition of the dispensary ideal—how it should be linked up with the sanatorium, the hospital for advanced cases, the farm colony, and the open-air school—acting as the "clearing-house" for each of these interdependent units in the scheme. At present this ideal has only reached finality in the city of Edinburgh, but with the new provisions for "sanatorium benefit," there is no reason why London should not be organized on these lines into one harmonious entity.

PERSONAL OPINIONS.

INSURANCE AND SANATORIUM BENEFITS.

By HENRY HYSLOP THOMSON,

M.D., C.M., D.P.H.,

Tuberculosis Officer, Newport, Monmouthshire; author of "Consumption in General Practice," etc.

The term "sanatorium benefit," as employed in the National Insurance Act, has been so amplified as to embrace within its meaning four distinct methods of applying treatment to the insured person who develops tuberculosis. In addition to three or four months' residence in a sanatorium, it includes home treatment, dispensary treatment, and treatment in hospital. The individual who requires treatment is recommended for sanatorium benefit by the local insurance committee, and the provision of the necessary machinery for carrying out the benefit rests with county and urban authorities, subject to approval by the Local Government Board and the Insurance Commissioners.

It is, of course, obviously impossible that the machinery necessary for the full provision of sanatorium benefits can be constructed and be set to work at a moment's notice. Along certain lines, however, it is possible for sanatorium benefit to be commenced forthwith. Efficient home treatment of suitable cases can be carried out at once by the general practitioner. Such treatment has to secure the approval of the Local Government Board, and, to be efficient, should include adequate open-air measures, antiseptic inhalations, tuberculin treatment, and precautions against infection.

The province of the Tuberculosis Officer, working through the Tuberculosis Dispensary, is in great part to assist in the early diagnosis of the disease, and to advise with regard to home treatment. The dispensary system is therefore the first part of the anti-tuberculosis machinery which should be established. The aim of the tuberculosis physician must be to work in harmonious co-operation with the general practitioner. His duties should include the giving of advice as to the suitability of cases for home treatment, hospital treatment or sanatorium treatment, and instruction regarding the variety of tuberculin to be used in individual cases, whether a strong tuberculin such as T.R. or B.E., or a milder preparation such as vacuum tuberculin P.T.O. or S.B.E. It is important that in each district there should be some

uniformity in the varieties of tuberculin used, and in the conditions under which it is administered. In addition to being a centre for diagnosis the dispensary will thus become a tuberculin station to which patients are referred, when necessary, for inoculation treatment, and where the general practitioner will be able to receive the necessary dilutions of tuberculin, and, if required, instruction in carrying out the treatment at home.

The Tuberculosis Hospital, working in touch with the dispensary, is the part of the benefit machinery which should next be established. The hospital should include accommodation for those advanced and infective cases which would prove a definite source of danger at home, and also accommodation for the observation of those cases of acute or protracted infection in which one is quite unable by a single examination to forecast the possibilities of treatment. Indeed, if the best results are to be obtained from sanatorium treatment, a period of observation will be necessary in many cases. No patient with a positive diazo or methylene-blue reaction in the urine should be admitted to the sanatorium, but if in consequence of treatment in the hospital the diazo-reaction disappears concurrently with a falling temperature, the patient may be drafted immediately to the sanatorium. Following the establishment of the dispensary and the observation hospital, adequate accommodation for Sanatorium Treatment must be provided. There exists a certain reactive type of pulmonary tuberculosis, for which a course of sanatorium treatment is essential if complete arrest of the disease is to be attained, and it is in this type that, owing to the absence of efficient control, domiciliary treatment will prove of little or no avail. Variation in type, with consequent variation in the requirements of treatment, is a characteristic feature of pulmonary tuberculosis, and the recognition of this fact is the first essential to the practical and successful application of the sanatorium benefit. For years sanatorium measures have constituted the dominant factor in the treatment of tuberculosis, and there is now a tendency for the pendulum to swing in the direction of domiciliary treatment, but care must be taken that it does not swing too far. The true inward meaning of sanatorium benefit is the most suitable and effective treatment according to the requirements of each individual case.

INSTITUTIONS FOR THE TUBERCULOUS.

WESTMORLAND CONSUMPTION SANATORIUM AND HOME, MEATHOP, GRANGE-OVER-SANDS.

THIS institution is somewhat unique in comprising a sanatorium for milder cases and a home for more advanced cases in grounds contiguous to one another, so that patients are readily transferred from one branch to the other according to the progress they make. The two branches

WESTMORLAND SANATORIUM: VIEWED FROM SOUTH.
Men's quarters in foreground. Administrative block behind.

are under the management of one medical superintendent, with an assistant physician; one matron, with an assistant matron; and the engineer, gardener, and their assistants are common to both; but each branch has its own nursing staff and maids.

The sanatorium, accommodating eighty cases, stands in about thirty acres of land, held on lease until 1934. It comprises an administrative block, two eight-bedded wards (one for each sex), and about three dozen "pagoda" shelters (each accommodating two persons, who occupy them day and night in all seasons). The dining-room (accommodating eighty patients), the men's recreation room, and the men's

and women's cloak-rooms and lavatories are quite detached, so that each is very well ventilated. There is a bowling-green for the men, a croquet-lawn for each sex, and a good-sized kitchen garden, in which are grown most of the vegetables required in the institution. A large stock of poultry is kept, furnishing a good supply of fresh eggs throughout the year, and a number of pigs are fattened on the broken food. A considerable variety of work is found for the patients on the premises, especially in the kitchen garden. An open-air school is carried on for the children.

The home, accommodating forty-five cases, stands in about thirty-five acres of land, and is constructed on a plan common to many sanatoria, comprising a number of one-bedded and two-bedded wards, a common room for each sex, a well-furnished bacteriological laboratory, and an administrative block, but having in addition several detached "pagoda" shelters for occupation each by two patients day and night in all seasons. The home and the land in which it stands have been purchased mainly out of donations, and have cost between £11,000 and £12,000, the excellent limestone used for building being quarried on the premises.

An excellent water-supply for the whole institution is brought from a distance of about ten miles. Each branch has its own separate sewerage, the sewage in both cases being dealt with upon the bacterial system in septic tanks and through revolving sprinklers on coke filter-beds. In the grounds are separate houses for (1) the medical superintendent; (2) the nursing staff of the sanatorium; (3) the engineer; and (4) the gardener and assistants. Also there is a detached building to accommodate the boilers, disinfectors, and electric plant; another for stabling, harness-room, etc.; and another for mortuary. The entire institution is lighted electrically.

WILLIAM RUSHTON PARKER, M.A., M.D.,
Hon. Secretary of the Sanatorium.

NOTICES OF BOOKS.

OPEN-AIR TREATMENT.

To the first number of the present volume of this journal Dr. T. S. Carrington contributed a most practical paper on "Modern Methods of Constructing Hospitals for Advanced Tuberculous Cases," and in our issue for October, 1911, there appeared a notice of Dr. Carrington's able work on "Tuberculosis Hospital and Sanatorium Construction." We are now glad to be able to welcome a further book, which we venture to think is one of the most valuable of recent contributions to a constructive policy in combating tuberculosis.[1] Dr. Carrington's new book, as Dr. Livingston Farrand explains in the preface, has been prepared at the request of the American National Association for the Study and Prevention of Tuberculosis. It is an eminently practical manual, for which we have nothing but praise. Although addressed to American readers, it nevertheless contains information, suggestions, and directions which will be of service in any land, and, at the present time, will be of particular assistance to organizers and administrators of so-called "sanatorium benefit" in this country. The work is a manual, not for theorists, critics, or research students, but for medical officers of health, tuberculosis officers, health workers, and other practical labourers, for the arrest of tuberculosis by rendering service to individual sufferers. The book is full of hints, plans, pictures, and detailed descriptions of agencies for dealing with tuberculous patients, by means of window tents, roof bungalows, wall houses and iron-frame porches, loggias, permanent sleeping porches, tents and tent-houses, open-air bungalows and cottages, roof playgrounds for children, and the like. There are no less than 150 illustrations. It is the most sensible endeavour to provide sound advice and reliable guidance in the provisions of hygienic treatment for tuberculous subjects that we have met with.

SPENGLER'S "IMMUNE SUBSTANCES."

In a previous issue of this Journal (July, 1910) Dr. Benöhr gave a description of Dr. Carl Spengler's "I.K.," but there has hitherto been no convenient and authoritative work suitable for reference by English physicians. We therefore welcome the compact, explicit, and enthusiastically written manual just issued by Mr. Walter H. Fearis.[2] "I.K." is an abbreviation of the German word "Immunkörper," sig-

[1] "Fresh Air and How to Use It." By Thomas Spees Carrington, M.D., Assistant Secretary of the National Association for the Study and Prevention of Tuberculosis. Pp. 250. With 150 illustrations. New York: The National Association for the Study and Prevention of Tuberculosis, 105, East Twenty-second Street. 1912. Price $1.00.

[2] "The Treatment of Tuberculosis by Means of the Immune Substances (I.K.) Therapy." An Introduction to Carl Spengler's work on Immunity and Tuberculosis. By Walter H. Fearis, formerly Demonstrator of Botany, University College, Reading. With a foreword by Dr. Carl Spengler. Pp. xx + 206. London: John Murray, Albemarle Street, W. 1912. Price 6s. net.

nifying immune substances, and Spengler and his disciples claim that it provides "the most efficient of the existing methods of treating pulmonary tuberculosis." The present book is a sort of epitome or abstract of Spengler's great work, "Tuberkulose- und Syphilis-Arbeiten," and Mr. Fearis promises us a fuller work in English, to which the present manual will serve as an introduction. Spengler's researches are full of interest, and deserve to be better known by English students. Many of his conclusions are so surprising, and yet so suggestive, that research workers should lose no time in either verifying or disproving them. Spengler recognizes two distinctly different types of tubercle bacilli as causal factors in human tuberculosis—*Typus humanus brevis* of Koch, and *Typus humano-longus* of Spengler. He holds that only one type of tubercle bacillus is found in cattle—the *true bovinus* organism—and that this is not identical with the *humano-longus* form found in man. Spengler's work "must be regarded as very strong direct evidence against the possibility of injection of man by true bovine tubercle bacilli derived from tuberculous cattle." Full details are given of Spengler's picric acid method for staining tubercle bacilli and other acid-fast bacteria. The views, methods, and claims of Spengler are set out with faith, enthusiasm, and conviction, and although there is unnecessary repetition and some lack of a critical attitude, the book is clearly written and throughout is of exceptional interest. Every student of the tuberculosis problem should carefully consider the statements, claims, and arguments set out in this suggestive manual. We hope Mr. Fearis will lose no time in issuing his larger work.

A TUBERCULOSIS CONFERENCE.

During recent years Great Britain has followed the example of other progressive countries, and has organized Conferences for the consideration and discussion of subjects connected with the study and arrest of tuberculosis. During the past summer an important Conference was held in Manchester, the Transactions of which have recently been published.[1] The papers collected in this well-printed volume deal with Tuberculosis in Childhood, the Powers and Duties of Sanitary Authorities and the Working of the National Insurance Act in connection with Tuberculosis, and the Position and Work of Voluntary Societies in connection with Tuberculosis under the National Insurance Act. Among the more important communications are the following: "The Presence and Prevalence of Tuberculosis in Childhood," by Dr. R. W. Philip; "The Share taken by Human and Bovine Tuberculous Products in the Infection of Young Children," by Professor Sheridan Delépine; "Tuberculosis during School Life: its Prevalence and the Means of Detection," by Dr. John Priestley; "Special Factors making for the Extension of Tuberculosis in the School, and the Measures for Prevention," by Dr. J. E. Squire; "Place of Special Schools in the Prevention of Tuberculosis," by Mrs. Leslie Mackenzie; "The Hospital School," by Mr. E. D. Telford; "Surgical

[1] National Association for the Prevention of Consumption and Other Forms of Tuberculosis, 20, Hanover Square, London, W. Transactions of the Fourth Annual Conference, held at the Milton Hall, Deansgate, Manchester, June 5, 6, and 7, 1912, under the auspices of the City of Manchester and the County Borough of Salford. Edited by J. J. Perkins, Hon. Secretary. Pp. 287. London: Adlard and Son, Bartholomew Close, E.C. 1912. Price 3s.

Tuberculosis: its Needs and Treatment," by Dr. H. J. Gauvain; "The Work of Local Authorities under the Insurance Act," by Dr. W. Leslie Mackenzie; "The After-Care of Patients who have been Treated in a Sanatorium." These will indicate something of the importance of the volume. There is also a valuable address by Her Excellency the Countess of Aberdeen. The Transactions will provide much material for thought, criticism, and further research. Such a volume as this will in coming years serve as a milestone to mark the march of the anti-tuberculosis campaign.

MANUALS FOR MEDICAL PRACTITIONERS AND WORKS OF REFERENCE.

Professor Adler's elaborate monograph on malignant disease involving the lungs and bronchi is one which all chest specialists will be well advised to study with care.[1] The work has entailed long and elaborate research, as is evidenced by the 211 pages of tabular abstracts of published cases. The author holds that "the increase in the percentage of lung tumours is to be attributed mainly to the increased attention paid to these types of tumour and the greater care and more extensive microscopic investigation with which autopsies are carried out at present." The cases presented are grouped under the headings—Carcinoma, Sarcoma, Doubtful and Miscellaneous. Pathological considerations and clinical features are carefully discussed, but unfortunately our knowledge is so limited that there is no possibility of any chapters having the headings of prophylaxis and treatment. Dr. Adler has produced a work of great merit and permanent value. The plates are beautifully executed.

We are glad to be able to welcome a new edition of "The Extra Pharmacopœia."[2] This work is now in its fifteenth edition and is one of the most valuable reference works we possess. It is now issued in two volumes, the smaller one dealing with matters analytical, experimental, and bacteriological, with information regarding the approximate composition of about 400 patent medicines, data respecting clinical methods, particulars of mineral waters, nutrimenta, and various tables of pharmaceutical and chemical interest. The larger volume contains a carefully revised and up-to-date extra pharmacopœial materia medica, with reliable, concise, conveniently arranged information as to vaccine therapy, organo-therapy, and other modern methods of treatment. There is an excellent section on Tuberculosis, with data regarding the various forms of tuberculin, their dosage, and indications for employment. There is a useful table for the conversion of doses of bacillary emulsion (B.E.), human or bovine, or mixed human and bovine, into equivalents of "bacillary substance." The references to recent literature are well selected. A section is devoted to Tuberculin Dispensary Treatment. The work is one which merits our

[1] "Primary Malignant Growths of the Lungs and Bronchi." A Pathological and Clinical Study. By I. Adler, A.M., M.D., Professor Emeritus at the New York Polyclinic, etc. Pp. xii + 325, with 16 plates. New York and London: Longmans, Green and Co. 1912. Price 16s. net.

[2] "The Extra Pharmacopœia of Martindale and Westcott." Revised by W. Harrison Martindale, Ph.D., F.C.S., and W. Wynn Westcott, M.B., D.P.H. Fifteenth edition. Vol. i., pp. xxxi + 1114; vol. ii., viii + 370. London: H. K. Lewis, 136, Gower Street, W.C. 1912. Price 21s. Or separately—vol. i., 14s. 4d., post free; vol. ii., 7s. 2d., post free.

enthusiastic commendation. It is one which is simply indispensable to every medical practitioner.

The Studio has done much for art and no little for the increase of human happiness and the betterment of habitations for humans by the issue of its various "special numbers." The spring number of this year's *Studio* deals with the Village Homes of England, and provides a wonderful collection of charming sketches and a number of beautiful reproductions of water-colour drawings by well-known artists.[1] There are also plans and illustrations of metal and wood work, and a text that affords charming reading. Such a book as this should be in the possession of every lover of the countryside, and if we mistake not it will open a kingdom of new possibilities to many tuberculous and tuberculously-disposed men and women who on grounds of health are advised to seek health and happiness in the open country and rural districts of our island home. We think a copy of this fine volume should have a place in the library of every sanatorium.

Sir Henry Burdett's great reference annual on hospitals and charities is now so well known to all medical advisers and workers in the cause of philanthropy that it is needless to do more than remind our readers that the volume for 1912 is now available.[2] It contains a list of "certain establishments for the open-air treatment of consumption," but this is by no means complete, and considering the interest now aroused and the attention which is being devoted to provision of establishments for tuberculous cases, we trust steps will be taken to provide an authoritative directory of sanatoria, dispensaries, open-air schools, and the like in next year's volume. Under the list of Chest Hospitals reference is given to many taking tuberculous cases, and in the section on Convalescent Homes are found the names of some institutions which take consumptive patients.

Messrs. J. Bibby and Sons, of Liverpool, are doing good medico-sociological work by the issue of their series of works on milk and matters relating thereto. The latest volume deals with legal aspects of the milk trade.[3] This concise, well-grouped record of the history of milk regulations and epitome of cases will be helpful to medical officers of health and others working for the protection and improvement of our milk supply.

Messrs. Edmond Browne and H. Kingsley Wood have prepared a valuable work on the new National Insurance Act which will be

[1] "The Village Homes of England." Text and illustrations by Sydney R. Jones, with some additional drawings in colour by Wilfrid Ball, R.E., and John Fullwood, R.B.A. Edited by Charles Holme. Pp. viii + 163. With 12 illustrations in colours and many in black and white. London, Paris and New York: *The Studio* Ltd., 44, Leicester Square, London, W.C. 1912. Price 5s.

[2] "Burdett's Hospitals and Charities for 1912." Being the Year-Book of Philanthropy and the Hospital Annual. Containing a Review of the Position and Requirements and chapters on the Management, Revenue, and Cost of Charities. An exhaustive record of hospital work for the year. It will also be found to be the most useful and reliable guide to British, American, and Colonial hospitals and asylums, medical schools and colleges, nursing and convalescent institutions, consumption sanatoria, religious and benevolent institutions and dispensaries. By Sir Henry Burdett, K.C.B., K.C.V.O. Pp. 1027. London: The Scientific Press, Ltd., 28 and 29, Southampton Street, Strand, W.C. 1912. Price 10s. 6d. net.

[3] "Bibby's Book on Milk. Section II. The Law relating to the Sale of Milk: its History, Criticism of its Administration, and Suggestions for its Amendment." Third edition. Pp. 97. Liverpool: J. Bibby and Sons. 1912. Price 1s., post free.

invaluable for reference to all who have in any way to advise or to act in the carrying out of the provisions of this beneficent measure.[1]

"Who's Who," the well-known directory of leading men and women in our national life, has proved such a valuable work for reference that naturally it has been followed by many volumes modelled on similar lines, dealing with various groups of professional, political, and social personalities. The latest book of this kind is "The Medical Who's Who."[2] The publishers state that they have made application to all medical practitioners in Great Britain and Ireland who are on the Medical Register for necessary particulars, but unfortunately many have failed to respond, with the consequence that the volume is by no means complete. The work is well planned and will undoubtedly be of value if it can be made thoroughly representative. It is intended that the volume will in future be issued in March of each year, so we may trust that the 1913 edition will mark an advance on this well-intentioned and promising first appearance.

The excellent series of popular illustrated handbooks issued by the Agricultural and Horticultural Association, Ltd., under the direction of Mr. Edward Owen Greening, have accomplished much in arousing an interest in the garden and stimulating many to participate in gardening, and thus they have served in no small measure the movement making for betterment of national health. The last addition to the series deals with "Indoor Gardens." It contains many suggestions likely to be helpful to invalids and health-seekers.[3]

Messrs. A. and M. Zimmermann, who are the British agents for Dr. Carl Spengler's "I.K.," have sent us several brochures dealing with the treatment of tuberculous cases by this immunizing agent.[4]

Acting on the suggestion of Dr. H. de Carle Woodcock, of Leeds, Messrs. Parke, Davis and Co. have issued a convenient form of Register for the record both by the physician and patient of observations as to the progress and treatment of a case attending a Tuberculosis Dispensary, or under guidance as a private client.[5] The idea is to be commended, and where a patient physician and a practical patient will loyally co-operate it will prove of real service.

[1] "The Law of National Insurance." With Introduction and Notes. By Edmond Browne, of the Middle Temple, Barrister-at-Law, and H. Kingsley Wood, Solicitor of the Supreme Court. Second edition. Pp. xlvii+436+42. London: Sweet and Maxwell, Ltd., 3, Chancery Lane, W.C. 1912.

[2] "The Medical Who's Who for 1912." Pp. xi+310. London: The London and Counties Press Association, Ltd., 6, Henrietta Street, Covent Garden, W.C. 1912. Price 10s. 6d.

[3] "Indoor Gardens." By T. W. Sanders, F.L.S. No. 40 of the "One and All Garden Books." Edited by Edward Owen Greening, F.R.H.S. Pp. 20. London: Agricultural and Horticultural Association, Ltd., 92, Long Acre, W.C. 1912. Price 1d.

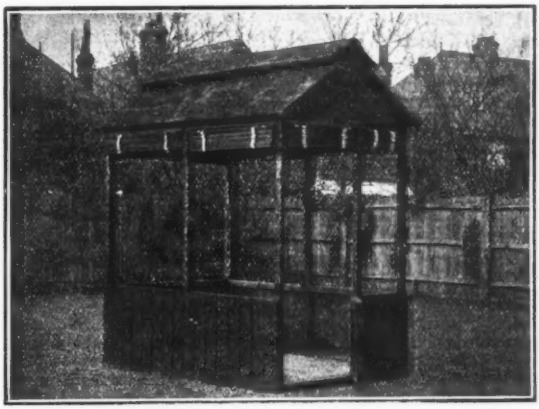
[4] For copies of the brochures on Dr. Carl Spengler's "I.K.," and for prices and full particulars of same, application should be made to Messrs. A. and M. Zimmermann, 3, Lloyd's Avenue, London, E.C.

[5] "A Daily Register for the use of Patients attending Tuberculosis Dispensaries or in Private Practice." London: Parke, Davis and Co., Beak Street, Regent Street, W. 1912. Price 6d.

PREPARATIONS AND APPLIANCES.

SANATORIA AND SHELTERS FOR THE TUBERCULOUS.

THE National Insurance Act is arousing all sorts and conditions of men and women to serious study and, we may hope, rational action for the arrest of tuberculosis. There is to be, at least in many parts of the country, considerable extension in the provision for institutional treatment of tuberculous patients, and greater attention is being given to secure adequate domiciliary management for such cases as are not dealt with in sanatoria. On all sides there are evidences that speedily there will be a demand for sanatoria and an urgent need for shelters and the like for tuberculous patients claiming "sanatorium benefit" in accordance with the provisions of the National Insurance Act. In previous issues of this Journal many and varied types of sanatoria



THE NEW VENETIAN SHELTER.

have been described and illustrated, and we have from time to time drawn attention to new forms of shelters, tents, and like structures for the open-air treatment of consumptives and other tuberculous subjects. A novel form of shelter has recently been introduced under the designation of "The New Venetian Shelter." Its general form and leading characteristics are indicated in the accompanying illustration. By means of strong, easily adjusted Venetian shutters, rain can be excluded and protection from wind provided, and yet the patient be still supplied with an abundance of pure air. The shelter is compact, easily erected, and is likely to be durable, while the cost is not great. We commend this new form of shelter to those who are on the lookout

for a good type of structure for outdoor treatment at home as well as in the grounds of the sanatorium.[1]

Many firms are now making shelters of various kinds, sizes, and at prices which meet the requirements of all classes. Messrs. Boulton and Paul, Ltd., who have won a well-deserved reputation for the excellence of their designs and work, now publish a most interesting and suggestive illustrated catalogue of "Shelters and Châlets."[2]

In Germany and other countries sanatoria built on the portable "Doecker" system have found much favour, and for open-air schools and shelters for consumptives they undoubtedly offer many advantages.[3]

Messrs. Kennan and Sons, Ltd., have erected a number of excellent shelters, châlets, and sunboxes in various parts of Ireland. They are now making a cheap form of "Sanatorium Tent" which is likely to be of considerable service.[4]

Messrs. J. T. Hobson and Co. have just issued an illustrated price-list of Revolving Shelters, Garden Houses, and Sleeping Châlets which should be of service to medical officers of health, tuberculosis officers, and others having to advise in regard to the domiciliary management of consumptives.[5]

A valuable illustrated catalogue, with plans of Sanatoria and Sleeping Châlets, has been issued by the manufacturers of the so-called "Speirsesque" Buildings. We advise our readers to get copies of Messrs. Speirs' illustrated lists.[6]

Messrs. Browne and Lilly make some excellent Single and Double Châlets for tuberculous cases, and some of their Bungalow Cottages would be admirable for the hygienic treatment of well-to-do patients.[7]

Messrs. Chipmans, Ltd., have won a well-deserved reputation for the excellence of their Wood Buildings. They are now making several good and inexpensive forms of shelters.[8]

Awhile since we gave a detailed description of the Economic Open-air Châlet designed by Dr. R. Foster Owen. We are glad to see that this ingenious structure has been improved, and is now being supplied at prices which should increase its popularity.[9]

[1] Full particulars, with prices of the new Venetian Shelter, can be obtained on application to the maker, Mr. G. W. Beattie, 198, Upper Richmond Road, Putney, London, S.W.

[2] Messrs. Boulton and Paul, Ltd., have their works at Norwich and a showroom at 126, Queen Victoria Street, London, E.C.

[3] Full particulars of the "Doecker" type of sanatoria can be obtained on application to Hygienic Construction and Portable Buildings, Ltd., Stockholm Road, South Bermondsey, London, S.E.

[4] A booklet, "Sanatoria Buildings," is issued by Messrs. Kennan and Sons, Ltd., and will be sent on application to their offices, Fishamble Street, Dublin, Ireland.

[5] "Illustrations of Revolving Shelters, Garden Houses, and Sleeping Châlets," being illustrations and specifications of copyright original designs by J. T. Hobson and Co., St. Mary's, Bedford.

[6] Particulars of "Speirsesque" buildings obtained on application to Speirs, Ltd., 13, Blythwood Square, Glasgow.

[7] See "Artistic Modern Dwellings and Other Structures," issued by Messrs. Browne and Lilly, Ltd., Fobney Works, Erleigh Road, Reading.

[8] Apply for price-list to Chipmans, Ltd., Columbia Works, Kingston Road, Staines, and at Colnbrook, Bucks.

[9] Information regarding this châlet may be obtained on application to the Economic Open-Air Châlet Co., 82, Southwark Bridge Road, London, S.E.; or the sole manufacturers, Messrs. Hibberd Bros., Ltd., 146, Vauxhall Walk, London S.E., and at Dorset Works, 82, Meadow Road, South Lambeth, London, S.W.

IONIZED AIR IN THE TREATMENT OF PULMONARY TUBERCULOSIS.

Lieut.-Colonel Robert Winder, of Belair, Bolton, Lancashire, has favoured us with particulars of an ingenious appliance which he considers may prove of service in the treatment of pulmonary tuberculosis. The apparatus consists of a disc or roller of vulcanite made to rotate rapidly by means of a small electric motor, or, if electric power is not available, by hand-driven mechanical power, over which is flannel. The friction between the vulcanite surface and the covering flannel electrifies the air in a special chamber which is insulated, and from which the ionized air is conducted to the patient through a tube, and is then inhaled. The inventor claims that "the best position to inhale the ions is to stand up in front of the apparatus and expand the lungs to the utmost extent." It is contended that "the air in the chamber possesses in a degree electric conductivity, and it owes the faculty to the presence of ions and to their motion under the action of electric forces. By the action of appropriate external energy--namely, by the electrified revolving disc—the air is ionized, the electrons unite with the neutral atoms and form negative ions, which are free to move among the molecules of the air." Colonel Winder believes that "the electrons on impinging on the epithelium of the lungs give up their charges to the blood-stream, and so invigorate the leucocytes that they are enabled more freely to throw off the phagocytes, alexins, and opsonins, which are designed to combat and destroy any bacilli which exist." The apparatus when in motion has to be driven at a high rate of speed, about 3,500 revolutions per minute. It is not assumed that the electric particles kill or weaken the tubercle bacilli in the tissues, but that the elements of the blood are so stimulated as to enable them to provide the natural restorative forces. We have examined and employed Colonel Winder's apparatus, and consider it well worth careful trial. In dealing with a disease such as pulmonary tuberculosis it is necessary to study the effects of any new "remedy" on a large number of cases of varying type, extent, and chronicity before any reliable opinion as to the efficacy of the measure can be expressed. Colonel Winder's apparatus should certainly be fully tested.

SHAVING A SANITARY NECESSITY.

In the conduct of measures to secure the prevention and arrest of tuberculosis, no hygienic requirements must be forgotten. There is, however, one sanitary necessity which is frequently forgotten or wilfully neglected. Every man who is suffering from open pulmonary tuberculosis should be directed to shave. Stringent regulations are in force to prevent promiscuous spitting; strict care is exercised in the collection and disposal of tuberculous sputum; but oftentimes no caution is given as to the importance of avoiding the possibility of fouling the moustache with tubercle bacilli. It may at once be said that it is practically impossible for a patient who is expectorating tubercle bacilli to keep his moustache from being contaminated. Sputum collecting about the hairs quickly dries up and is scattered in fine dust, and becomes a source of danger to relatives and associates, nurses and doctors. It is astonishing, however, to find consumptive cases, in sanatoria or in hospital, and under strict medical supervision, who are

permitted to wear a moustache, often large and pendulous, and certainly such as cannot be kept bacteriologically clean. To every consumptive should be explained the necessity for shaving. Moreover, it is of the greatest importance to encourage patients, and particularly tuberculous subjects, who are only too apt to lapse into lazy, selfish, lackadaisical habits, to continue interest, not only in personal hygiene, but in the cosmetic and decorative aspects of individual life. On both hygienic and æsthetic grounds it is well that all consumptive men should shave. Certainly no consumptive father should ever think of kissing his children if he insists on retaining his moustache. There are a number of forms of safety razors now available, and for many patients, especially those undergoing open-air treatment, such are often a real boon. Our attention has recently been directed to a new form which offers many advantages.[1] The so-called "Universal Safety Razor" shaves with a sliding diagonal motion, which it is claimed is the only scientifically correct way. The blade is made of the finest quality of chrome steel, and hardening, tempering, grinding, and honing, is conducted with the greatest possible care, and, finally, the edge of every blade is subjected to microscopic inspection. The guard is so arranged that it can be changed from one side of the blade to the other to meet the requirements of the operator. All the metal parts of the razor, except the blade, are of nickel silver, and the handle is of "Ivoroy." We believe patients only need to try this form of "safety" to appreciate its excellencies.

Many patients, and, indeed, not a few healthy men, experience much difficulty in stropping their razors. For all such the "Acme" Automatic Stropper will prove a veritable boon.[2] Tuberculous subjects, especially in sanatoria, will find it of the greatest service. It can be used for sharpening either the old-fashioned type of razor or any of the approved forms of safety blades. The strop has a series of small diagonal ridges, interspersed with smooth area. The blade is carefully inserted in its place, and then all that has to be done is to make a few pulls of the travelling leather, to procure a smooth, velvety edge. No preparation or dressing of any kind is required.

The Élite Toilet Company have introduced, under the title of "Quickshave," an elegant preparation which patients undergoing open-air treatment will know how to appreciate.[3] It is a fragrant foam for shaving without the use of soap or water, and even those who have no experience of sanatorium life will recognize what an advantage such a preparation will be, particularly during winter months. The same company supply other cosmetics, shampoo powders, and an excellent form of dentifrice.

REQUISITES FOR THE SANATORIUM AND THE PATIENT.

Every doctor, nurse, and patient at some time or other requires a reliable, convenient, and quick means whereby water, nutrient liquids,

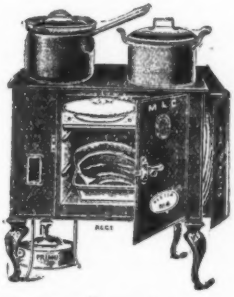
[1] The Universal Safety Razor is manufactured by Messrs. Landers, Frary and Clark, 31, Bartholomew Close, London, E.C. Price complete, with one extra blade, 10s. 6d.

[2] The "Acme" Automatic Stropper is manufactured by Messrs. Grindley and Co., of Tunstall, Staffordshire, price 10s.

[3] "Quickshave" is manufactured by the Élite Toilet Co., a branch of the County Chemical Co., Ltd., Chemico Works, Bradford Street, Birmingham.

food, and the like, may be heated. In these days of antisepsis, provision for sterilization of water, even in the most out-of-the-way places, must be found. The open-air patient, camper-out, or traveller for health or pleasure, requires some form of stove. Undoubtedly the best is the "PRIMUS," and we believe medical advisers and patients only require practical experience of its advantages to make it generally recognized as an essential equipment in the outfit of every open-air patient, and certainly no sanatorium can afford to be without these convenient and inexpensive aids to comfort and well-being. The accompanying illustrations indicate the chief features of one of the best patterns of

"PRIMUS" STOVE.



"PRIMUS" HESTIA OVEN.

"Primus," and also the ingenious "Primus" Hestia COOKING OVEN, which will be found particularly valuable for campers.[1] These stoves use ordinary paraffin-oil, without wick, and burn with a strong, blue flame, devoid of smoke or smell. The "Primus" is easily lighted, readily regulated, and can be extinguished as expeditiously as an ordinary gas-flame. It can be used not only for heating water or boiling fluids, but for cooking, grilling, toasting, heating irons, and the like. The "Hestia" Oven makes it possible to cook a complete dinner for half a dozen people more quickly and at a lower cost than is possible with either gas or coal.

In most sanatoria, and certainly in open-air sleeping châlets and other hygienic structures intended for tuberculous patients, the accommodation for the protection and storage of hats and garments, rugs, and other articles of apparel or materials for comfort, is commonly very inadequate. We are glad, therefore, to be able to draw attention to a most practical and convenient form of "UNDER-BED" CLOTHES CHEST which has been invented and made by Messrs. William Baker and Co. of Oxford.[2] It can be obtained in either stained deal or oak, fitted with rubber-tyred wheels, and of size, shape, and substance admirably suited for the purpose for which it has been introduced.

[1] The "Primus" Stoves are supplied by Richard Melhuish, Ltd., 50, 51, and 84, Fetter Lane, Holborn Circus, London, E.C., and 143, Holborn Bars, London, E.C., at prices from 9s. upwards. An illustrated catalogue will be sent on application.

[2] The "Under-Bed Clothes Chest," in selected oak, fumed, costs 24s. 6d., and will be sent on application to the makers, Messrs. William Baker and Co., The Broad, Oxford.

Messrs. Gay and Co. have sent us specimens of their "Patent Impenetrable" White PAINT and "Langthorne" White ENAMEL, both of which will be of service for the protection of woodwork in connection with sanatoria, shelters, châlets, and the like.[1] They possess marked weather-resisting qualities.

Not a few patients experiencing for the first time the open-air life of the Sanatorium, or placed to sleep in shelters or chalets, develop a fear, generally, of course, altogether unfounded, of invasion by animals or other undesirable visitors. For the reassurance of such nervous patients there might be provided the practical combination, introduced by Mr. Riome, of a STAFF and POLICE WHISTLE.[2] The truncheon is made of polished lignum vitæ, with a good shrill-call whistle attached at the handle end. Such a companion serves as an excellent protector, and where patients are sleeping in isolated shelters the whistle will serve admirably as a call-signal.

STAFF AND WHISTLE.

PINOLEUM.

In dealing with many of the inflammatory conditions of the nose, throat, and larynx, often met with in consumptive and tuberculously-disposed patients, medicaments applied by means of an effective spray or reliable nebulizer are frequently of considerable service. A compact, simple, and inexpensive form of NEBULIZER OUTFIT has recently been brought to our notice.[3] It is intended for use with "Pinoleum," which consists of triple-distilled oil of eucalyptus globulus, oil of Ceylon cinnamon, Brazilian pine-needle oil, menthol, camphor, and other anomalies, and doubly-refined liquid petroleum. The preparation is an excellent alkaline, antiseptic oil preparation, and proves very satisfactory in relieving many morbid states of the mucous membrane lining the respiratory passages.

[1] Particulars will be sent on application to Messrs. R. Gay and Co., Ltd., Caxton House, London, S.W., and Langthorne Works, Stratford Market, London, E.

[2] Riome's Combination Staff and Police Whistle can be obtained, price 4s. 4d., post-free, from the maker, Mr. A. C. Riome, Manor Road, Gravesend.

[3] The Pinoleum Nebulizer Outfit is manufactured by the Pinoleum Company, of 408-412, Thirteenth Street, New York City. Price $1. The British agents are the American Drug Stores Company, 24, Orange Street, Haymarket, London, W.C.

NOTES.

NATIONAL INSURANCE AND SANATORIUM BENEFIT.

The National Health Insurance Commissioners having conferred with the Local Government Board, directions have been issued for the guidance of Insurance Committees in organizing and initiating the administration of "sanatorium benefit" for tuberculous cases. "'Sanatorium benefit' consists of treatment given at the cost of the National Health Insurance Fund to persons suffering from tuberculosis (the chief form of which disease is consumption), or such other diseases as the Local Government Board, with the approval of the Treasury, may appoint [Section 8 (1) of the Act]. For the time being the benefit is confined to the treatment of tuberculosis." It is further indicated that "the first duty of an Insurance Committee with respect to sanatorium benefit is to make provision for the treatment of cases of tuberculosis occurring among insured persons, for the administration of whose benefit they are responsible. They may, if they think fit, extend treatment to the dependants of insured persons or to any class of such dependants; but during the initial period it will be desirable to confine the benefit to insured persons until the financial liabilities of the committee can be more accurately estimated." The Chancellor of the Exchequer has made the following statement regarding financial arrangements for defraying the cost of schemes for treatment of tuberculous patients: "As regards capital expenditure, the Government have provided a sum of £1,500,000 to aid the provision of sanatoria and other institutions; and in their Circular Letter of the 14th May last the Local Government Board announced that, subject to certain limitations, they would provide three-fifths of the outlay on sanatoria and four-fifths of the outlay on dispensaries out of this fund. We understand that local authorities are satisfied with these arrangements, and that their main anxiety is in regard to the annual cost of maintenance. I gathered that local authorities are prepared to bear 25 per cent. of the annual cost of schemes if the remainder were provided from other sources; and that their request is that this should be paid to them direct by the Local Government Board. . . . Under the Insurance Act an annual sum of about one million is provided for the treatment of insured persons. While the Bill was passing through Parliament, provisions were inserted for extending sanatorium benefit to dependants of insured, and in view of this the Government consented to bear one-half of any deficit in regard to sanatorium benefit where local authorities undertook the other half. It is now urged that schemes for the treatment of tuberculosis should relate to the whole community, and that generally they should be organized and carried out by the councils of counties and county boroughs. This extension involves additional outlay, and in view of this the Government have decided to place at the disposal of the Local Government Boards of the three kingdoms annually a sum of money which will represent approximately half the total estimated cost of treating the non-insured persons as well as the dependants of insured persons. This money will be distributed

by the Local Government Boards, in pursuance of regulations to be made by those Departments, to local authorities which undertake schemes, to be approved by the Departments, for the general treatment of tuberculosis in their areas, and provision will be made accordingly for these grants in the estimates of the three Departments. As regards the cost of treating insured persons, the sum already provided under the Insurance Act, which, as I have already stated, is about one million pounds, can only pass to local authorities in pursuance of agreements made between them and Insurance Committees. But I have no doubt that Insurance Committees generally will be anxious to deal with the local authority of their area, and the Association may rest assured that the Government will do all in their power to secure this."

The National Health Insurance Commission (England) have issued an important circular[1] for the guidance of Insurance Committees, which contains the following suggestions as to procedure: "(1) The Insurance Committee will probably have already appointed a Sub-Committee to deal with sanatorium benefit. If they have not already done so, they should without delay take the question into consideration. To the Sub-Committee may properly be delegated, among other duties, that of considering and reporting to the Committee upon individual applications for benefit, and, if the Committee think fit, of deciding cases within the general lines of administration and of expenditure laid down by the Insurance Committee. In counties of large area the Committee may find it of advantage, for the preliminary consideration of applications for the benefit in different parts of their area, to appoint also local Sub-Committees, which could usefully consider applications from insured persons resident in their locality, and report on the cases to the County Committee. The medical adviser to the Committee, or a deputy, should be present at all meetings of the local, as of the central, Sub-Committee, to advise them on the cases before them. It should be remembered that the scheme of arrangements of an Insurance Committee for the treatment of insured persons, whether in institutions or otherwise, must be submitted to the Commissioners for approval. (2) The preliminary procedure, in dealing with applications for benefit, will necessarily differ in districts where a tuberculosis officer has been appointed from that required in a district where no such appointment has been made. (3) In the former case, the Committee will no doubt make satisfactory arrangements with the authority appointing the tuberculosis officer for his services to be made available as medical adviser to the Committee, on the lines laid down in paragraphs 15 to 17 of the Memorandum on the Administration of Sanatorium Benefit, copies of which were addressed to the Committee on the 6th instant. Where such arrangements have been made, applicants for sanatorium benefit may at once be referred to the tuberculosis officer for medical examination and report. (4) Where the services of a tuberculosis officer are not available, it will be necessary for provisional arrangements to be made as indicated in paragraph 36 of the memorandum above mentioned." Medical officers of health in many parts of the country have elaborated schemes suited to the particular needs of the districts for which they are responsible. Wales is

[1] Administration of Sanatorium Benefit, Circular Med. 1, issued by the National Health Insurance Commission (England), Buckingham Gate, London, S.W., July 25, 1912.

arranging for the organization of a special scheme for the whole Principality. Special arrangements are being made for Ireland. In all parts of the country endeavours are being made to secure an organization and administration which shall be effective and economical. The enterprise is a great one, but many and varied difficulties have to be met and overcome. But a national State-directed anti-tuberculosis movement having been commenced, it is incumbent on every citizen to assist in surmounting obstacles and bringing the much-needed succour to the large army of necessitous tuberculous sufferers who are hoping and waiting for relief. The task that awaits is not an easy one. The tuberculosis problem is still far from being solved. Special difficulties have to be met and overcome.

Sir William Osler, M.D., Regius Professor of Medicine in the University of Oxford, in his statesmanlike letter to the *Times* of August 16, has indicated something of the need for discretion, discernment, and scientifically based practical knowledge if the tuberculosis campaign is to be carried to a successful issue. The letter is of such far-reaching importance that we venture to quote it *in extenso:* "(1) In any campaign organization is the first essential; and in so complicated a struggle as that in which we are engaged, and which must extend over three or more generations, success or failure will depend on the character of the general staff of the army engaged. We are fortunate in having in the Local Government Board an effective working machine dealing with public health, and at its head a man both sympathetic and intelligently enthusiastic in all that relates to tuberculosis. It is to be hoped that a comprehensive scheme may be laid down, on lines suggested by the Astor Committee, co-ordinating the various agencies: (*a*) At the head departments of the Local Government Board, with, if it is possible, lay and professional representation. (*b*) Central institutes, in each of the three capitals, dealing with the educational, social service, and scientific aspects of the work. For research purposes, it is to be desired that the energies should be concentrated in one large laboratory. (*c*) Dispensaries officered by trained men, whose work would be supervised directly from the central bodies. (*d*) Sanatoria and hospitals. (*e*) The general practitioners, medical officers of health, and nurses, who constitute the fighting units of the army. Co-ordination in the work of these factors is essential. Let me give an illustration of the kind of work needed at once. All are agreed that the fighting line will centre about the dispensary. No provision exists for the training of their officers, who should have special instruction in methods of work, and particularly in diagnosis. The appointments will be well paid, and the public has the right to demand well trained men. It should be a duty of the general staff to arrange suitable courses at the dispensaries and special hospitals. In London it would be easy to arrange an attractive three months' programme, utilizing the Brompton Hospital, the existing tuberculosis dispensaries, and the Lister Institute. In Edinburgh Dr. Philip and a few of the younger men at the Royal Infirmary could arrange courses for Scotland. The diagnosis of tuberculosis is often very difficult, mistakes are common—mistakes are going to cost much money, and it will pay the public to demand that the men in charge of the dispensaries are thoroughly equipped for the work. To make provision for the training of this officers' corps

should be the first duty of the tuberculosis sub-departments of the Local Government Board. (2) May I make an appeal to link, when possible, the tuberculosis work with existing hospitals and dispensaries? The scheme, as you emphasize in your editorial of the 7th ult., is a general one, over-reaching the provisions of the special clauses of the Insurance Act. Why dissociate this work from our general hospitals? Why ask them to cut off one-tenth of their patients? It will be an easy matter to arrange for the payment of insured persons, and it should not be difficult to attach the tuberculosis officer to the staff of the hospital. The advantages are: (*a*) Many patients apply to the dispensary who are not tuberculous, and can be turned over promptly to the proper departments. (*b*) Many cases of bone, gland, and other forms of local tuberculosis need surgical advice and treatment, which they can receive while attending the special dispensary. (*c*) Patients applying in other departments, and found to be tuberculous, are transferred at once. (*d*) Doubtful cases, many patients with abdominal, gland, and bone disease, early forms of pulmonary tuberculosis, may be admitted to the wards at once for observation. (*e*) It is an incalculable advantage to the tuberculosis officer to have affiliation with a general hospital. (*f*) For the sake of the public, I should be sorry to see the members of the staffs of our general hospitals deprived of the opportunity of seeing so important a disease as tuberculosis. And this plan works well. One of the most successful of existing tuberculosis dispensaries I was able to start, by the generosity of Mr. Henry Phipps, in connection with the Johns Hopkins Hospital. It now forms an important part of a great medical school, through which every student, as a matter of routine, passes as a clinical clerk. If for no other purpose than this, every general hospital with a medical school should have its tuberculosis department. The tuberculosis work of the Oxfordshire branch of the National Association has centred about the Radcliffe Infirmary, the treasurer, committee, and staff of which, with commendable liberality, have not only given the dispensary accommodation, but have for the past two years set aside from twelve to twenty beds on the balconies for tuberculosis. Doctors, nurses, and patients are all the better for this association. (3) Before any great outlay upon sanatoria, let us have the dispensaries in full working order, in which way alone in each district we can ascertain the cases needing home and shelter, sanatorium, and hospital treatment. Let me conclude with an appeal for organization, for a general staff, which will control the Government funds, direct the campaign, plan the education of doctors, nurses, and the public, organize research, and act as co-ordinating centres for the manifold activities engaged in the work."

WORK AND THE RESTORATION OF THE CONSUMPTIVE.

Graduated labour is now firmly established on scientific principles as an important agent in the treatment of the tuberculous. Not only is work desirable in many cases for its beneficial action on physical conditions, but its influence, psychically, must never be overlooked. This aspect of the rôle of work in the restoration of the consumptive has received special consideration in many of the sanatoria of the United States. If there is to be a considerable extension of sanatoria in this country, as seems probable, we hope doctors and architects

A BUSY DAY IN THE WORKSHOP OF THE ADIRONDACK COTTAGE SANITARIUM.

will not overlook the necessity of providing hygienic workshops for the patients. Through the kindness of Dr. Lawrason Brown, of Saranac Lake, New York, and the courtesy of Messrs. Lea and Febiger, 706-710, Sansom Street, Philadelphia, U.S.A., we are permitted to reproduce the accompanying suggestive illustration of a scene in the workshop of the Adirondack Cottage Sanitarium.

THE MARRIAGE OF THE TUBERCULOUS.

This subject, like most important subjects, has two sides to it. There is an aspect of the problem which has recently been very clearly stated by Professor Leonard T. Hobhouse in his "Social Evolution and Political Theory," published by the Columbia University Press of New York. The case is so well put that we reproduce it here, knowing that it will be of service to many of our readers: "Take the case of tuberculosis. The heredity of this disease is still a matter of some question. For the sake of argument, I will assume the diathesis to be hereditary. No one can deny that it is in that case a serious blemish. But before we proceed to pass sentence of exclusion from the rights of parenthood on any individual of tuberculous stock, I think we should have very carefully to weigh two questions. The first is, What are the other qualities of the individual? Liability to tuberculous infection involves no mental or moral turpitude. It may coexist with the highest qualities on this side. I am not aware that it even involves any other form of physical weakness, though some other forms of physical weakness may no doubt increase the liability to tuberculous infection. Now, if we stamp out the tuberculous tendency, what other qualities are we stamping out along with it? If an otherwise gifted stock has this blemish, will there be net loss or net gain in its disappearance? I do not think that this question can be answered offhand. But if our general view of progress is correct, society has on the whole gone forward by the development of those arts which assist to keep alive many who, without such aid, would have perished; and considering the very wide prevalence which is now believed to obtain of some form or another of the tuberculous condition, it may be doubted whether, if the tubercle had been left to do its work unchecked, there would have been any social progress at all. Secondly, it is well within the bounds of possibility that, by the development of scientific hygiene, instead of eliminating the tuberculous stock, we may succeed in eliminating the tubercle. In that case this particular tendency—unless provably correlated with some other form of irremediable weakness—will no longer rank as a defect. If in the meantime we had prohibited the marriage of members of such stocks, we should have lost all that they might have contributed to the population and its well-being for the sake of no permanent gain."

A TUBERCULOSIS EXHIBITION.

An exhibition of appliances, fittings, materials, and products relating to sanatoria and dispensaries for tuberculous subjects and of preparations for the treatment of tuberculosis is now open at the offices of the Society of Medical Officers of Health, 1, Upper Montague Street, Russell Square, London, W.C. The exhibits have been selected with care and are representative. They range from economical methods

of constructing sanatoria to the most recent improvements in diagnostic instruments. Several fresh designs in fixed and revolving shelters are on view, and some new inventions of considerable importance from a public health point of view are being exhibited for the first time. A special section is devoted to the heating and lighting of sanatoria, dispensaries, and institutions generally, and various economical cooking appliances designed for catering for large numbers have been submitted for inspection, together with laundry fittings and various types of disinfectors. Some exhibits deal with the preventative and curative aspects of the problem of tuberculosis in the United Kingdom, and in view of the importance of the matter from the point of view of the public health, it is intended to keep the exhibition open for a period of twelve months, the exhibits being varied and added to as improvements occur. A detailed description of the Exhibition is given in the September number of *Public Health*, and information respecting the Exhibition can be obtained on application to the Executive Secretary of the Society. All medical officers of health, tuberculosis officers, and others practically concerned in the organization and administration of measures for dealing with the tuberculous should visit this Exhibition.

PATHS OF PROGRESS.

On all sides are evidences of the increasing power of the anti-tuberculosis movement. All sorts and conditions of men and women are realizing that in the combat with consumption they have to render individual service. With the new powers and the more perfect machinery provided by the National Insurance Act, there will speedily come better organization and administration of our forces, with more rational co-operation of workers and a wise co-ordination of work. For the moment, much must necessarily be experimental; but it is clearly the duty of all striving for the arrest of this scourge of our people to assist in every way possible in securing a more scientific basis for the conduct of the campaign than has been possible in past days.

We have received a number of reports of sanatoria and dispensaries each of which evidences the keen thought and enthusiastic action which is being brought to bear on the tuberculosis problem. One cannot, however, help feeling that much would be gained if greater uniformity could be attained, not only in the outward appearance of these annual publications, but in the arrangement of their records. At present most of them are of almost purely local interest, and do not allow of reliable collocation and helpful comparison to serve national ends

The first report of the St. Marylebone Dispensary is a particularly excellent and encouraging one, and with its series of analytical tables provides an immense amount of valuable and suggestive information.[1] The description of the working of the experimental open-air class for children in Regent's Park should stimulate many others to follow this wise example. Dr. Halliday G. Sutherland has elaborated a report which may well serve as a model for other tuberculosis dispensaries.

We have just received the Second Annual Report of the Tuberculin

[1] First Annual Report of the St. Marylebone Dispensary for the Prevention of Consumption, 15, Allsop Place, London, N.W. Pp. 67, with illustrations. London: Martin and Son, the Manswood Press, 18, Lisson Grove, Marylebone, N.W.

Dispensary League so energetically conducted under the chairmanship of Dr. Camac Wilkinson, with its working centre at 263, Kennington Road, London, S.E.[1] It affords information regarding the results of cases dealt with at the chief dispensary, with particulars of the spread of what may be called the tuberculin dispensary movement to other parts of the country.

The last report of the Society for the Prevention and Cure of Consumption in the County of Durham[2] contains records of the cases treated at the Stanhope and Wolsingham Sanatoria, the former taking men, and the latter women and children. The pamphlet also contains a section on "The Modern Treatment of Consumption," suitable for patients and social workers.

The Fourth Annual Report of the Ayrshire Sanatorium at Glenafton, New Cumnock, N.B., contains a series of analytical tables dealing with all aspects of the problem, as exampled in the cases under treatment. Dr. Edward E. Prest has made his report a particularly complete and instructive one.[3]

The "Assistencia Nacionalaos Tuberculosos" have sent us an interesting volume of illustrations of the tuberculosis dispensaries and sanatoria in Portugal, which shows that the newest of European republics is waging successfully "La Lutte contre la Tuberculose."[4]

Mr. T. H. Holding, in his booklet "Refined Camping," provides much useful information which will be of service to many tuberculous subjects who are living the simple open-air life and directing their own commissariat.[5]

We are glad to be able to call attention to the opening of Sussex House as an "After-Care" Home for London's City Workers. It is conducted on open-air lines and meets a real need. Individuals can remain under the medical supervision of their own advisers. Sussex House stands in its own grounds at Highgate, 400 feet above sea-level, and is under the direction of Miss Muriel J. Candler, who is a trained nurse with exceptional experience of the management of tuberculous subjects.[6]

[1] Second Annual Report of the Tuberculin Dispensary League. Pp. 32. London: George Pulman and Sons, Ltd. 1912.

[2] The Thirteenth Report of the Society for the Prevention and Cure of Consumption in the County of Durham—Stanhope Sanatorium opened May 15, 1900; Wolsingham Sanatorium opened May 1, 1909. Pp. 49. Sunderland: R. Youll, 28, Northumberland Street. 1912.

[3] Fourth Annual Report by the Medical Superintendent of the Ayrshire Sanatorium, under the Public Health Authorities Combination. Ayr: The *Ayr Advertiser* Office. 1912.

[4] "La Lutte contre la Tuberculose," prepared by the "Republique Portugaise" for "VII Congrès Internationale contre la Tuberculose." Lisbon: Typographia Mendouça, R. Corpo Saulo, 46 a 50. 1912.

[5] "Refined Camping," by T. H. Holding. London: 7, Maddox Street, W.

[6] Full particulars may be obtained on application to Miss Candler, Sussex House, Bishopswood Road, Highgate, London, N.

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To

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MEMORANDA.

EDITORIAL.—All Original Articles, Books for Review, Preparations for Notice, etc., should be sent to the Editor, Dr. T. N. KELYNACK, 139, Harley Street, London, W. (Telephone: 3684, Paddington).

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A DIRECTORY OF SANATORIA.

This Directory of Sanatoria has been compiled to provide medical practitioners and others with a convenient and reliable reference list of private and public institutions for tuberculous patients. The Publishers will be glad to be informed of any corrections or additions.

ENGLAND AND WALES.

Place.	*Name and Address.*	*Terms per Week.*
ALTON (*HANTS*)	Lord Mayor Treloar's Cripple Home and College, Alton, Hants,	
ANGLESEY ...	Penhesgyn-y-Gors, Menai Bridge.	
AYSGARTH (*YORKS*)	Wensleydale Sanatorium, Aysgarth, S.O., Yorks.	2 guineas inclusive.
BARRASFORD ...	The Newcastle-on-Tyne and Northumberland Sanatorium, Barrasford, Northumberland.	
BEDFORD ...	Daneswood Sanatorium, Woburn Sands.	
BELBROUGHTON	Bourne Castle Open-air Sanatorium, Belbroughton, Worcestershire.	From 3 guineas.
BENENDEN ...	Sanatorium of "National Association for the Establishment and Maintenance of Sanatoria for Workers suffering from Tuberculosis," Benenden, Kent.	30s.; Beds maintained by Public Bodies and Trade and Friendly Societies.
BINGLEY (*YORKS*)	Eldwick Sanatorium, for women and children, Bingley, Yorks.	30s.
BOLTON (*LANCS*)	Wilkinson Consumption Sanatorium.	
BOURNEMOUTH	Royal National Sanatorium for Consumption and Diseases of Chest, Bournemouth.	7s. 6d. and a Governor's nomination.
	The Firs Home, Bournemouth.	
	The Home Sanatorium, West Southbourne, near Bournemouth.	3 to 5 guineas.
	West Howe, Kinson, Bournemouth.	
BRIGHTON ...	Municipal Sanatorium for Brighton Townsfolk, Brighton.	
BROADSTAIRS ...	Home Sanatorium for Children, Eastcliff House, Broadstairs, Thanet.	
BROMSGROVE ...	The Mount Sanatorium, Fairfield.	
BURY ST. EDMUNDS	Bury and West Suffolk Sanatorium.	
CHAGFORD ...	Dartmoor Sanatorium, Chagford, Devon.	3 to 5 guineas.
CHEDDAR ...	Engel Home, for gentlewomen and girls, Cheddar, Somerset.	
CHELTENHAM	Cotswold Sanatorium, near Stroud, Cheltenham.	
	Salterley Grange Sanatorium, near Cheltenham.	
CHESTERFIELD	The Ashover Sanatorium, Chesterfield, Derbyshire.	2½ to 5 guineas.
CRANHAM ...	Margaret Street Sanatorium for Children, Cranham, Stroud.	
CROYDON ...	Campbell House, Campbell Road, Croydon.	
DARLINGTON ...	Felix House, Middleton St. George, Darlington, co. Durham.	
DIDWORTHY ...	Devon and Cornwall Sanatorium, Didworthy, South Brent.	Free and by payment.
DORKING ...	Woodhurst Sanatorium (for women and girls only), Tower Hill, Dorking, Surrey.	
EVERSLEY ...	Moorcote Sanatorium, Eversley, Hants.	From 3 guineas.
FARNHAM ...	Crooksbury Sanatorium, Farnham, Surrey.	

ENGLAND AND WALES—*Continued.*

Place.	*Name and Address.*	*Terms per Week.*
FARNHAM ...	Whitmead Sanatorium, Tilford, Farnham, Surrey.	
FRIMLEY ...	Brompton Hospital Sanatorium, Frimley, Surrey.	
GRANGE-OVER-SANDS	Westmorland Sanatorium, Grange-over-Sands.	2 guineas to out-county patients.
HARPENDEN ...	Sanatorium for Children of the National Children's Home and Orphanage	
HASTINGS ...	Fairlight Sanatorium, Hastings.	By subscriber's letter, 11s. 6d.; without, 17s. 6d.
HATFIELD ...	Chantrey House, Hatfield.	
HOLT	Kelling Sanatorium, Holt, Norfolk.	For poor patients
	Children's Sanatorium for the Treatment of Phthisis, Holt, Norfolk.	
HORSFORTH ...	Dean Head Sanatorium, Horsforth, Yorks.	
HULL	Hull and East Riding Convalescent Home, Withernsea, Hull.	
ISLE OF WIGHT	Royal National Hospital for Consumption, Ventnor, I.W.	10s. and a Governor's recommendation.
	Hawthorn Dene, Bonchurch, Ventnor, I. W.	From 2 guineas.
	St. Catherine's Home, Ventnor, I.W.	10s. 6d. by selection.
LANCHESTER (*DURHAM*)	Maiden Law Sanatorium.	
KNIGHTWICK ...	Open-Air Treatment Sanatorium, Ankerdine Hills, Knightwick.	
LEEDS	Leeds Sanatorium for Consumptives, Gateforth, near Selby, and Leeds Hospital for Consumptives, Armley, Leeds.	Free for poor of Leeds.
LISS (*HANTS*)...	Oakshott Hanger, Hawkley.	
LITTLE BADDOW	Alfred Boyd Memorial Sanatorium, Chelmsford.	
LIVERPOOL ...	Liverpool Sanatorium for Consumptives, Kingswood, Frodsham, Liverpool.	
HESWALL (*CHESHIRE*)	West Derby, Liverpool and Toxteth Park Joint Sanatorium, Heswall.	
LLANYBYTHER	West Wales Sanatorium, Llanybyther, Carmarthenshire.	
LONDON	City of London Hospital for Diseases of Chest, Victoria Park, London, E.	
	Royal Hospital for Diseases of the Chest, 231, City Road, London, E.C.	
LONDON (HAMPSTEAD)	Mount Vernon Hospital for Consumption and Diseases of the Chest, Hampstead, London.	Free on Governor's recommendation.
LONDON (HIGHGATE)	Sussex House, Bishopswood Road. An after-care boarding-house for city workers.	From 1½ guineas
LONG STRATTON	Fritton Sanatorium, The Beeches, Long Stratton, Norfolk.	
MANCHESTER...	Hospital for Consumption and Diseases of Throat and Chest at Bowdon, Manchester, and Crossley Sanatorium, Delamere, Cheshire.	Free and by payment.
MANSFIELD ...	Ransom Sanatorium, Sherwood Forest, Mansfield, Nottingham.	Free, or 10s. on recommendation of subscribers.

ENGLAND AND WALES—*Continued.*

Place.	*Name and Address.*	*Terms per Week.*
MARGATE ...	Royal Sea-bathing Hospital (for Surgical Tuberculosis), Margate, Kent.	30s.; on recommendation of Governors, 8s. and 12s. according to age.
MENDIP HILLS	Nordrach-upon-Mendip, Blagdon, near Bristol.	3 to 5 guineas.
	Mendip Hills Sanatorium, Wells, Somerset.	From 3 guineas.
MIDHURST ...	King Edward VII. Sanatorium, Midhurst, Sussex.	2 guineas.
MUNDESLEY ...	Mundesley Sanatorium, Mundesley, Norfolk.	5 guineas.
NAYLAND ...	East Anglian Sanatorium, and Maltings Farm Sanatorium for poor men and women patients, Nayland, Suffolk.	
NEW QUAY (CORNWALL)	"Tregwella," New Quay, Cornwall.	
NORTHALLERTON	Ruebury Sanatorium, Osmotherley, Northallerton, Yorks.	From 3 guineas according to requirements (4 beds only).
NORTHAMPTON	Northamptonshire Sanatorium, Creaton.	
NORTHWOOD ...	Mount Vernon Sanatorium, Northwood, Middlesex.	30s.
OCKLEY	Ockley Sanatorium, Ockley, Surrey.	2½ guineas.
PAINSWICK ...	Painswick Sanatorium, Cotswold Hills, Painswick, Gloucestershire.	
PENMAENMAWR	Nordrach-in-Wales, Pendyffryn Hall, Penmaenmawr, North Wales.	
PEPPARD COMMON	Kingwood Sanatorium, for ladies; Maitland Sanatorium, for working-classes, Peppard Common, Oxon.	
RAMSGATE ...	St. Catherine's Hospital for Consumption.	15s.
READING ...	Boxgrove Cottage Sanatorium, Tilehurst.	
RINGWOOD ...	Linford Sanatorium, Ringwood, Hants.	4 to 5 guineas
RUDGWICK ...	Rudgwick Sanatorium, Rudgwick, Sussex.	2½ guineas.
RUTHIN	Vale of Clwyd Sanatorium, Llanbedr Hall, Ruthin, North Wales.	5 guineas.
SANDON	Merivale Sanatorium, Sandon, near Chelmsford, Essex.	3 to 6 guineas.
SHEFFIELD ...	City Hospitals for Consumptives (males), Commonside; and Crimicar Lane (females), Sheffield.	
SKIPTON	Eastby Sanatorium, for males, Skipton, Yorks.	
SLINGFOLD (*SUSSEX*)	Private Home, Warwick Lodge, Slingford, Sussex.	
STANHOPE ..	Durham County Sanatorium for men, Stanhope, R.S.O., Durham.	Free and by payment.
STANNINGTON	Children's Sanatorium, Stannington, Northumberland.	
ST. LEONARDS	Eversfield Chest Hospital, West Hill, St. Leonards.	10s. with subscriber's letter. (10 beds free Metropolitan Hospital Fund.)
SUDBURY (*SUFFOLK*)	Chilton Hill House, Sudbury, Suffolk.	

ENGLAND AND WALES—*Continued.*

Place.	*Name and Address.*	*Terms per Week.*
THRELKELD ...	Blencathra Sanatorium, Threlkeld, Cumberland.	
TORQUAY ...	Mildmay Consumptive Home (for advanced cases only), Torquay.	10s. 6d., or 7s. with subscriber's letter.
	Western Hospital, Torquay.	7s. 6d. by nomination, 12s. 6d. without.
WINSLEY ...	Winsley Sanatorium, Near Bath.	
WOKINGHAM ...	London Open-Air Sanatorium, Pinewood, Wokingham.	3 guineas.
YELVERTON ...	Udal Torre Sanatorium, Yelverton, South Devon.	31s. 6d. to 42s.
WOLSINGHAM ...	Durham County Sanatorium, for women and children. Wolsingham, Co. Durham.	Free and by payment.

SCOTLAND.

ABERCHALDER (*INVERNESS*)	Inverness-shire Sanatorium, Aberchalder, N.B.	Free and by payment.
ABERFOYLE (*PERTHSHIRE*)	Children's Home Hospital.	
BANCHORY (*DEESIDE*)	Nordrach-on-Dee, Banchory.	5 guineas.
BRIDGE OF WEIR (*RENFREW*)	Consumption Sanatoria of Scotland, Bridge of Weir, Renfrewshire.	
COLINTON ...	Bonaly Cottage Sanatorium, Colinton, N.B.	
DUNDEE	Sidlaw Sanatorium, near Dundee.	
EDINBURGH ...	Royal Victoria Hospital for Consumption, Edinburgh.	Free; with a limited number of beds at £1 1s.
	Woodburn Sanatorium, Morningside, Edinburgh.	
GALASHIELS ...	Meigle Sanatorium, Galashiels, N.B.	
KINGUSSIE, N.B.	Grampian Sanatorium.	
KINROSS-SHIRE	Coppin's Green Sanatorium.	
KIRKINTILLOCH	Lanfine Home.	
LANARK	Bellefield Sanatorium, Lanark.	
MILNATHORT,	Ochil Hills Sanatorium, Kinross-shire.	
NEW CUMNOCK	Ayrshire Sanatorium, Glenaften, New Cumnock, Ayrshire.	
OBAN	Argyll County Sanatorium, Oban.	
PEEBLES... ...	Manor Valley Sanatorium, Peebles, N.B.	
PERTH	Barnhill Sanatorium, Perth, N.B.	

IRELAND.

DONERAILE ...	Cork County Sanatorium, Heatherside, Doneraile, co. Cork.	
DUBLIN	Larch Hill Sanatorium, Dublin.	
FORTBREDA ...	Forster Green Consumption and Chest Hospital, Fortbreda, Belfast.	Six beds free, others by small payment.
WARRENPOINT	Rostrevor Sanatorium, Warrenpoint, co. Down.	3 to 3½ guineas.
WICKLOW ...	Altadore Sanatorium, Kilpedder, Wicklow.	
	The Royal National Hospital for Consumption for Ireland, Wicklow.	Minimum, 7s., on subscriber's recommendation.

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